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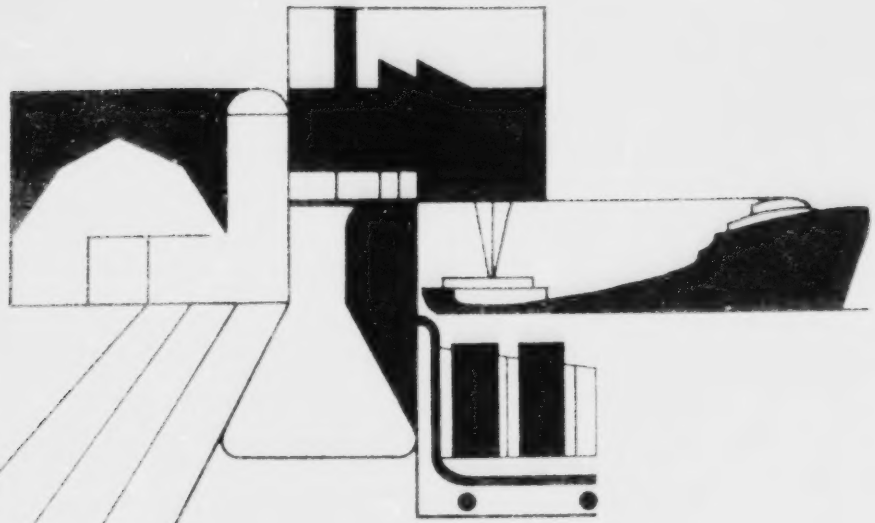

# CHALLENGE FOR GROWTH

## an Agri-Food Strategy for Canada

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DISCUSSION PAPER

# STRATEGY FOR THE AGRI-FOOD SECTOR

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# STRATEGY FOR THE AGRI-FOOD SECTOR

## INTRODUCTION

This Discussion Paper has been prepared in response to a request of the federal Cabinet. It outlines in general terms the range and type of support activities required during the 1980s if the food and agriculture sector is to maximize its contribution to the growth and development of the Canadian economy and play an enhanced and more effective role internationally. As such, it is a framework document designed to assist governments and the private sector, through consultation, to reach agreement on the elements of an agri-food strategy for Canada for the next decade and on their respective roles and responsibilities.

## THE ELEMENTS OF AN AGRI-FOOD STRATEGY FOR CANADA

The Canadian agri-food sector has a unique opportunity for growth from now until the end of the century, and beyond. World food requirements are growing at a rate that will put unprecedented pressure on its ability to produce food. Canada has the land, people, technology, and capital to increase by two-thirds the agri-food sector's output. An opportunity, however, is not a guarantee!

An overall or grand strategy for the agri-food sector must build on the existing policy and program framework by enriching three component strategies, namely: market development, strengthening the supply base, and mission-oriented agricultural research. In order to present the implied changes in overall strategy, the sections that follow review the importance of the industry and provide an historical perspective of past and current strategies. These sections are followed by a listing of the constraints which impeded full development of the agri-food sector's contribution to the Canadian economy. The required enrichment of the three component strategies mentioned above are then developed and illustrated with examples of the types of activity required for their implementation.

### 1. THE AGRI-FOOD SECTOR

#### (a) Dimensions

The agri-food sector includes input suppliers, farmers, processors, distributors, retailers, and governments. It is important in the economy of every region of Canada. In 1979, from farmer to consumer, it employed 853 thousand persons; investment

was $96.5 billion; food purchased by consumers amounted to $30.8 billion. Export sales in 1980 were nearly $8 billion. The 17.8 percent of Canadian consumers' disposable income spent on food is among the lowest in the world. The sector is basically sound, both technically and economically. Its present soundness is closely related to past government action, both domestic and international.

## 2. THE AGRI-FOOD STRATEGY IN RETROSPECT

### (a) Public Interest

From Confederation to the present, the government has been concerned with improving the sector's productivity. The stimulus of government-sponsored research has dramatically increased the productivity of the sector. From 1950 to 1970, these gains in productivity were largely captured by consumers who were able to meet their food needs with a decreasing proportion of their incomes. Farmers, however, encountered declining and highly variable real incomes, frequent periods of surplus production, and consequently unacceptably low farm gate prices.

### (b) Instability

Governments responded in two ways. The first of these was legislation that permitted the formation of marketing boards to encourage more orderly marketing and to improve farmers' bargaining power. Up to 60 percent of Canadian farm produce is sold through marketing boards, most of which exert no control over production. The second way in which the federal government responded was through price support programs. The primary means of price stabilization has been a deficiency payment to producers of a product or group of products when the level of producer returns has fallen below the previous five-year average price by a predetermined amount. In the last decade, several provincial governments have developed price stabilization programs of their own in the belief that federal support levels have been too low. A great deal of time has been spent in efforts to harmonize price stabilization programs across the country. Failure to achieve it will result in balkanization of Canadian agriculture and reduced efficiency and productivity. Current federal price support to agriculture is about $400 million annually.

In addition to reducing market risks, the federal government matches producer premiums for crop insurance. These crop

insurance programs are administered at the farm level by the provinces. The annual federal contribution is now $100 million.

(c) Market Development

The Canadian government has actively sought better access for Canadian products in foreign markets. Reduced tariffs and better access were negotiated for many Canadian agricultural products during the last round of multilateral trade negotiations. More effective protection for a number of important horticultural crops was negotiated at the same time. Major institutions associated with market development include the Canadian Wheat Board and the Canadian Dairy Commission. Producer marketing boards are also active in the development of new markets. Agriculture Canada's food safety, quality inspection programs, and livestock record of performance programs contribute to market development by assuring buyers, both domestic and foreign, that high quality standards are met.

(d) Research

Agriculture Canada's strong mission-oriented research and development programs continue to make essential contributions to crop and livestock improvement, to the efficient utilization of agricultural resources, and to market development. The present soundness of the Canadian agri-food sector has depended on an expanding base of research and technology.

(e) Farm Finance

The Farm Credit Corporation and various provincial lending agencies have provided long-term financing to Canadian agriculture. The Farm Improvement Loans Act permits the government to guarantee shorter-term loans to farmers made by chartered banks and other designated lenders.

(f) Regional Development

Since the early 1970s, the Department of Regional Economic Expansion (DREE) has influenced the course of development of the agri-food sector in all regions through such measures as the Agricultural and Rural Development Act, the Fund for Rural Economic Development, the Regional Development Incentives Act, and the Prairie Farm Rehabilitation Administration, in effect since

the 1930s. More recently, DREE has contributed funding under the General Development Agreements, through various subsidiary agreements, for the development of the agri-food industry.

Together, these policies and programs, along with the generally available federal and provincial support programs covering transportation, employment and industrial development, have produced the favourable environment that has enabled the Canadian agri-food sector to make the productive investments that keep it sound and competitive. These policies and programs are systematically being reviewed and have led to initiatives to rationalize stabilization programs and to new cost-recovery measures.

## 3. CONSTRAINTS TO GROWTH AND DEVELOPMENT

Canada has the potential to nearly double the output of its agri-food sector and at the same time to aid developing countries to meet their food requirements, provided that the agri-food sector is supported by an enabling agri-food strategy in the public sector. This strategy must deal with the following constraints:

(i) short-term commodity price variability;

(ii) natural hazards;

(iii) inadequate levels of production and processing research;

(iv) environmental damage;

(v) rising petroleum-based input costs;

(vi) competition in commercial markets with other countries and among provinces;

(vii) regional self-sufficiency programs;

(viii) natural resource base limits;

(ix) business units that are outdated technically and in business structure;

(x) inadequate support of assistance to developing countries;

(xi) inadequate transportation and handling facilities;

(xii) inadequate long-term capital; and

(xiii) variable levels of management expertise.

The grand strategy for dealing with these constraints requires market development, strengthening of the supply base, and mission-oriented agri-food sector research.

## 4. STRATEGY FOR MARKET DEVELOPMENT

Market development is both the cutting edge and driving force which motivates and provides guidance to the formulation of strategies for strengthening the natural resource base and mission-oriented agricultural research. Both commercial and concessional requirements for food are expected to increase dramatically over the next two decades. Commercial exports depend on the ability of foreign countries to earn sufficient foreign exchange to purchase agri-food products and services. On the other hand, concessional funding is required either to subsidize prices to meet those of competitors or to supplement the importing country's inadequate budgetary and/or foreign exchange resources. Even if Canada acted in concert with all the other countries which are traditional exporters of food and other donor nations, including the oil-rich OPEC members, it would be unrealistic to expect to meet the total anticipated needs of developing and industrialized countries for basic foodstuffs during the next 20 years.

If the Canadian agri-food sector is to achieve its potential share it must develop new commercial markets and maintain existing ones for the commodities in which Canada has or can develop a competitive advantage. Internationally this implies an intensified effort directed towards industrialized countries offering relatively free access to food imports, developing countries with significant commercial import potential, and those centrally planned countries with similar import potential. Where commodity import replacement offers significant benefits, coordinated market and production efforts will be made to exploit the opportunities.

Given this overall objective, the elements of the strategy for market development include:

(i) optimizing value-added in the agri-food system;

(ii) improving access to foreign markets;

(iii) increasing efficiency in the Canadian agricultural and food delivery system;

(iv) improving coordination between governments and industries;

(v) promotion of a "buy Canadian" philosophy in secondary and retail outlets; and

(vi) the encouragement to private institutions to develop new methods of marketing Canadian food products.

In implementing the various elements of the marketing strategy, attention will continually be paid to the United States, which will remain Canada's main export competitor and principal import supplier.

The marketing strategy for the public sector requires a multifaceted approach. It involves attention to the following:

(i) market intelligence and analysis;

(ii) market structure and institutions;

(iii) market controls;

(iv) market infrastructure; and

(v) marketing coordination.

Each of these is developed more fully below.

Market Intelligence and Analysis

(a) Market Information and Outlook

Accurate and timely information on market prospects is essential to market development. This means that the present extensive markets information system be updated so that current information is transmitted, analysed, and made available as rapidly as possible to private firms and others. Special attention in the analysis will have to be directed towards the interrelationships

among markets both foreign and domestic. A much higher level of electronic processing and transmission than that existing now is implied.

(b) Identification of Market Opportunities

Rapid changes in demand characterize many markets both foreign and domestic. Increased efforts to identify the resulting market opportunities by type of product and client will enhance the ability of smaller Canadian firms to enlarge their markets. The information made available must be in specific terms that permit Canadian suppliers to know the options open to them.

(c) Coordination of Supplies

In order to assure that market development opportunities are exploited, dependable suppliers of quality products tailored to meet market requirements must be identified. Information on these must be part of a customer-oriented referral centre which would link potential buyers and sellers. Special emphasis must be given to the encouragement of stable long-term contractual arrangements.

Market Structures and Institutions

(a) Foreign Ownership in the Food Industry

The performance of foreign-owned firms in the food industry must be examined so that ways and means can be found to enhance their willingness to compete in export markets in competition with their parent companies if necessary.

(b) Food Processing

Emphasis needs to be placed on measures to increase the efficiency of the food-processing industry, expand its total output, and encourage growth in all regions. The potential for increased sales exist provided industry and governments expand their horizons from primarily domestic markets and mount co-ordinated export sales efforts.

(c) Certain Aspects of Marketing Board Operations

Improvements need to be sought in the operation of marketing boards. They must be encouraged to give greater attention to

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market performance and expansion. The monitoring and supervisory responsibilities of the National Farm Products Marketing Council need to be enhanced.

(d) Self-sufficiency Objectives

A considerable degree of regional self-sufficiency is compatible with efficient resource use because of high transportation costs. However, efforts need to be made to maintain and enhance the benefits from free access to the larger national market.

The federal government must continue to cooperate internationally to seek commercial agreements that reduce the adverse impact of instability in world markets whether caused by climate, disease, or the policies of other nations.

Canadian ODA in the food and agriculture sector should be focussed on those developing countries which have both the potential to increase food production and the will to undertake the necessary structural reforms to become more self-sufficient.

(e) Market Price Fluctuations

Programs with producer participation, designed to even out the income flow caused by short term price variations, must be developed. Such programs should operate so as not to interfere with the effects of long-term market forces.

Market Controls

(a) Health and Safety Regulations

The federal government must continue to use the GATT code on technical barriers to assure itself that it is continuously informed of proposed changes to the regulations of other countries. GATT procedures for bilateral consultation must also continue to be used to reduce or eliminate the effect of unwarranted health or safety regulations.

(b) Tariff Regulations

Where tariffs exist against Canadian products in export markets, opportunities to negotiate them downward must be actively sought.

(c) Non-Tariff Barriers to Trade

A system needs to be developed to identify non-tariff barriers in export and domestic markets. In international markets, GATT procedures and/or high level meetings should be used to a greater extent than in the past to eliminate or reduce the impact of such measures on Canadian agri-food exports. Domestically the federal government needs to take the initiative to ensure that provincial governments are aware of non-tariff barriers among provinces and seek, through consultative procedures, to eliminate the adverse effects on regional comparative advantage.

(d) Trade Policy

The anticipated expansion of the revenue of the agri-food sector from sales in the international market will increase the vulnerability of the sector to forces which distort those markets and de-stabilize prices. For this reason, the agri-food strategy should seek to liberalize international agricultural trade and to persuade developed nations to modify agri-food policies which restrict and distort international trade and de-stabilize prices. In particular, the agri-food strategy should be concerned about constraints inherent in the agri-food policies of major trading partners, eg. the United States, the European Economic Community, and Japan.

Marketing Infrastructure

(a) Distribution and Storage

Governments, through Agriculture Canada, must identify, in cooperation with the private sector, distribution and/or storage constraints. Where loans are made, they should be directed towards the enhancement of commercial viability.

(b) Credit

Programs may need to be developed for agricultural exporters to ensure their competitiveness in significant export markets.

(c) Risk Capital

The capability in government to evaluate long-term shifts in the agri-food sector needs to be enhanced. This will permit the

direction of government risk capital, when economically warranted, to new ventures that offer the potential of contributing to Canadian economic development and leadership in the world agri-food system.

(d) Processing Facilities

Cooperative industrial-scale demonstration projects directed towards an upgrading of food processing facilities may need to be considered.

Marketing Coordination

(a) Between Governments

To improve the consultative process between the federal government and the provinces in areas of joint activity, especially those related to import substitution and exports, the existing mechanisms need to be strengthened and new ones developed.

(b) Between Government and Industry

Since the marketing strategies can only be accomplished through close cooperation between agri-industry and government, more emphasis must be given to strengthen Agriculture Canada's efforts with individual firms.

5. STRATEGY FOR STRENGTHENING THE SUPPLY BASE

(a) Requirements

Strengthening the natural resource base through research and regional development must be related to identified market opportunities.

Several federal government departments influence agricultural production and federal and provincial governments share the responsibility for maintaining and strengthening the supply base. The role of the provinces is particularly important because land resources and extension services are under their jurisdictions. Consultation, liaison, and cooperation within the federal government and with provinces are key elements in the strategy.

The strategy for strengthening the supply base must ensure an adequate flow of advancing technology resulting from accelerated research and technology transfer combined with incentives to motivate productive investments.

Expanding the supply base depends upon:

(i) conserving and upgrading the land resource;

(ii) improved transportation capability;

(iii) the development of management systems and restructuring of many farms in both technical and business aspects to ensure continuance of viable family farms;

(vi) the provision of an adequate supply of funds for financing of productive investments;

(v) availability of adequate crop insurance;

(vi) reduction of summerfallow acreage as part of both production-expansion and essential soil conservation;

(vii) development and adoption of high-yielding crop varieties for short growing seasons;

(viii) addition of new land to total cultivated acreage;

(ix) development and adoption of energy saving technology;

(x) regional development and adjustment assistance; and

(xi) assuring maintenance of adequate human resources.

Canada has reached the limits of the good land available for crop production under current technology, but world-wide land resources have been exploited to the point that extension of crop production has to be made on land of low inherent productivity. Government programs must be accompanied by commitments on the part of individual entrepreneurs to adopt production practices which will ensure the conservation and/or upgrading of the land resource. Canadian agricultural land, often of good quality, is still going to other uses, including residential, industrial, recreational, and reforestation. Governments must examine this situation and implement appropriate instruments to adequately safeguard agricultural land.

(b) Programs and Activities

(i) **Consultation:** Some progress in strengthening the Canadian agricultural supply base can be achieved at very little cost by more effective consultations on agricultural development with farmers, agri-business, and other levels of governments. The staff of regional offices of Agriculture Canada, in consultation with provincial counterparts, are and will continue to prepare regional agricultural development strategies and coordinate them at the national level. This should encourage more effective development initiatives and ensure better integration and complementarity.

(ii) **Infrastructure:** Throughout the agri-food system transportation inadequacies inhibit optimum development. Rationalizing the statutory Crow Rate structure is particularly critical to the development of the agricultural supply base in Western Canada. Other infrastructure issues are improved weather reporting for farmers, modernized pedigree livestock records system, and a soil information system for individual farmers. There is considerable scope for improving these information systems based on up-to-date EDP technology.

(iii) **Technology Development and Transfer:** Consideration should be given to establishing demonstration farms and expanding information activities to provide better dissemination to farmers of research results and their application. Production and management programs for crops and livestock must focus on technology gaps, managerial deficiencies, communication packages, farm-level testing of new technology, and farm business management systems. A strengthening of the genetic selection programs for livestock should be undertaken.

(iv) **Farm Credit:** A comprehensive medium-term credit review involving federal and provincial governments and private lenders should be undertaken to ensure that intermediate-term credit responds appropriately to the needs of Canadian farmers during the 1980s.

(v) **Regional Development and Adjustment Assistance:** The strategy would include development and adjustment programs which establish regional capabilities on sound

technical and economic bases. For example, energy adjustment assistance programs, rangeland and forage development, and other initiatives of a regional-specific nature are required. Moreover, the strategy has to take account of the need to assist small producers who face difficulties in adjusting to changing input costs, market opportunities, and technology.

(vi) Human Resources: Research will require additional scientists and technicians as restrictions on research during recent years have reduced the number of scientists being trained. The need for educational facilities to train future farm managers in technology and business management will increase. Provision of these facilities will be an essential feature to include in the development of human resources. Programs to ensure the supply of seasonal and fulltime workers in the agri-food sector, such as the Canada Manpower Mobility Program and the Canada Manpower Industrial Training Program for Canadian workers, and the Commonwealth Caribbean Seasonal Agricultural Workers Program, and the Mexican Seasonal Agricultural Workers Program, will need to continue.

## 6. MISSION ORIENTED RESEARCH STRATEGY

### (a) Role of Research

In the 1980s the agri-food sector will face both increased competition and demand and will become even more dependent on Research and Development (R & D) to maintain its efficiency and ability to adapt to new and different challenges. There will be special need for fundamental research on biology and engineering to make the scientific breakthroughs on which applied technological advances are based. The nature of this research is such that the federal government, through Agriculture Canada, must provide the required leadership and coordination.

Agriculture Canada has major research stations in every province and region. These are widely dispersed at over 40 locations from coast to coast. This orientation to farmer and processor problems in the regions will be maintained and effectively integrated with provincial activities for both research and technology transfer.

Cooperation with the universities in research adds strength and perspective to agri-food research. This relationship will need to continue. In food processing, where there is the greatest need for expansion, close association with the private sector must be an important feature of the research program.

(b) Areas Offering Challenges

(i) Land and Water Resources: The productivity of the land resource must be increased, within its natural limitations, and managed so as to prevent further degradation due to cultural practices. More extensive research on land and water management is urgently required to deal with problems of soil erosion and salinity. An aggressive program of research in Western Canada in a soil and water research centre, integrated with a parallel program in the Hydrology Institute of Environment Canada, is required. The centre would be concerned with effective control of water to reduce the increasingly serious problem of saline soils and salt accumulation and towards better management of ground water in the soil and the control of its vertical and lateral movement. Indirectly related to these are the problems of summerfallow and zero tillage. The Institute would be concerned with the aspects of hydrology involving lakes, rivers, streams, and the quality of water.

(ii) Energy: The conservation of energy, the possibilities of actual production, and the use of alternate sources on farms offer opportunities to reduce the need for purchased energy, particularly petroleum-based products. The present Agriculture Canada program of contract research needs to continue.

(iii) Animal Production: Much of the major grain production of the country, as well as native forages, could be marketed through animal feed, thereby adding significantly to the total value of agricultural output. Serious animal production problems exist that limit livestock production and their solution would provide the basis for additional farm and processor incomes. Animal disease and insect control and improved feed efficiency are examples of practical

problems where research can contribute. R & D for animal production may require new research facilities for swine production, meat handling and storage, reproductive efficiency, meat toxicology, and animal nutrition.

(iv) **Crop Production:** Because of climatic and soil limitations, the improvement of crop production is particularly critical in Canada and the present major program must be strengthened. The breeding of hardier varieties better adapted to short, cool seasons needs to be combined genetically with the high yield, quality, and nutritive value available from species grown in competing countries. The control of plant pests is an integral but ever-changing part of crop production, and must be accomplished through an integrated approach to pest management that avoids complete reliance on chemical pesticides. Additional research resources may be needed to meet the challenges in crop production.

(v) **Basic Research:** This is often given second priority, but is a prerequisite to achieving advances. Examples of promising areas are nitrogen fixation, genetic engineering, somatic hybridization, and cryo-preservation where increased emphasis on basic research is essential to make further progress. In addition to highly trained personnel there is an associated need for specialized scientific equipment.

(vi) **Food Processing:** The utilization research phase of Agriculture Canada's program has tended, until recently, to be a relatively minor part of the total program. Currently this area has a much higher priority and will require an increase in facilities and resources located near processing plants. New laboratories and additional support for established units will be required particularly in Ontario, Quebec, the Atlantic Provinces, and British Columbia. Examples of new and challenging areas for research are ingredient technology, enzymology and fermentation, single cell protein, improved energy efficiency, and waste utilization.

(vii) **Northern Development:** There are very few areas left in Canada for agricultural expansion and most of these are in the North. As world food demand increases,

it will be necessary to develop these areas. This will first require research and development of crop varieties and management practices that offset the limitations in climate and soils of the northern regions. For this purpose, a Northern Agricultural Research Institute may need to be established. Such a centre could also make a direct contribution to the welfare of native peoples living in these areas.

## 7. INTERNATIONAL STRATEGY FOR CANADA'S DOMESTIC AGRI-FOOD OBJECTIVES AND INTERNATIONAL DEVELOPMENT COOPERATION PROGRAM

### (a) Canada's Domestic Agri-Food Objectives

In addition to those elements outlined above in section 4 in the strategy for market development which have an international dimension, there are several other international components.

(i) Bilateral Agreements with other countries to provide a framework for scientific exchanges and cooperation in the agri-food sector: These agreements are used to promote Canada and the export of Canadian goods and services directly related to the agri-food industry.

(ii) Canadian representation abroad and on the secretariats of international institutions concerned with agriculture: In order to provide the scientific and professional expertise in the agri-food sector requried to enhance Canada's international influence and promote the export of Canadian agricultural products and services, additional Canadians with scientific and managerial backgrounds in agriculture are required at the professional and policy levels of multilateral agencies, as members of Canadian diplomatic and consular missions abroad, and as members of Canadian delegations at international conferences and meetings.

(iii) Agricultural Research: In addition to Canada's ODA funding of international agricultural research under CIDA's program aimed at improving the ability of developing countries to produce more and better agricultural products, Agriculture Canada should provide project funding for international agricultural research in areas where Canadian institutions, firms, and scientists have acquired a high degree of technical, industrial, or scientific expertise. Projects

supported by Agriculture Canada should have high Canadian visibility and foster close relationships between the Canadian agri-food sector and decision-makers in countries with significant commercial opportunities for the development of major Canadian export markets in agri-food products and services.

(b) International Development Cooperation

During the 1980s the level of Canadian ODA is expected to increase from ODA/GNP ratio of 0.45 to 0.5 percent in 1985 and to 0.7 percent by 1990. In view of the anticipated widening of the gap between global food production and the needs of the world's population during the next 20 years, a larger share of Canadian ODA will be devoted to the agricultural sector in the future. Within the agricultural sector, increased resources and attention will be focussed on helping these developing countries which have the capacity and desire to increase the degree to which they are able to become more self-sufficient in food and safe water.

Many of today's developing countries have the potential to become more important to Canada in the future both as markets for Canadian exports and as suppliers of goods and services required by Canadians. However, even those developing countries which may not have strong and direct commercial and financial ties with Canada are becoming more important to us because of the increasingly active international network of economic, social, and political inter-relationships. Canada's aid program is sensitive to these international relationships.

Agriculture Canada is a major source of professional and technical expertise on the agri-food sector. As such, and as a federal government department, it contributes to Canada's ODA Program by supporting CIDA's activities in the field of international development cooperation. This support not only coincides with Canadian domestic and international objectives and programs but can lead to complementary mutual benefits.

The program component of the agri-food strategy that relates to international development cooperation concerns the need to improve the linkage between the Canadian agri-food industry and Canada's ODA program in the agriculture sector. Consequently, Agriculture Canada is considering the establishment of a small multi-disciplinary group in its Regional Development and

International Affairs Branch to study and assess national and international issues in food and agriculture as they relate to the involvement of the Canadian agri-food sector in Canada's development cooperation program.

## RESOURCE REQUIREMENTS AND PRIORITIES

The strategy is designed to take advantage of the strong market outlook for the output of the agri-food sector. The combination of favourable market outlook and the potential productivity of Canadian resources managed by the private sector portends a real value of output of the Canadian agri-food sector in 2000 more than double that of 1980. The strategy also realistically takes into account constraints that must be overcome. In consideration of the outlook, potential productivity, and constraints, a mutually supporting series of programs is put forward. The priorities within this series are international market development, improvement in the transportation system, and research in food processing and into the problems of expanding the extensive and intensive margin of the resource base. Action under these priorities will involve a reorganization of the existing pattern of support to meet these priorities. There is every indication that the shift will result in a greater payoff to the industry.

However, as the strategy is translated into programs and income is generated in the private sector, the need for government support in some areas can be expected to decline relative to the growth of the sector. Consideration will be given to stabilization measures which involve voluntary producer participation with governments. This would offer an opportunity to reduce the longer-term financial commitments of governments to stabilization. The need for funds to support stabilization programs could also be expected to decline because the indicated favourable income-cost relationships would enable producers to handle instability by business practices or with their own institutions. Moreover, income opportunities would provide flexibility that would encourage producers to shift resources to the most productive investments. The possibilities of cost recovery and of transfer of functions to the private sector should be fully explored as a further means of reducing expenditures by governments. For example, certain food inspection services and research projects may be considered for cost recovery or private enterprise.

## FEDERAL/PROVINCIAL CONSIDERATIONS

Agriculture is one of only two economic sectors where concurrent federal and provincial powers exist under the terms of the British North America Act. As a consequence, federal/provincial working relationships have evolved under this joint jurisdiction. Federal services tend to be concentrated in the areas of basic and applied research, quality assurance, market development, and income protection, while provincial services emphasize agricultural education and extension and natural resource issues. Close formal and informal federal/provincial co-operation and collaboration in providing the services needed for the development of the sector have been important characteristics of the relationship. In this environment, unique federal/provincial institutions and arrangements have evolved; for example, The Canadian Agricultural Research Council, the Canadian Agricultural Services Co-ordinating Committee, the annual Federal/Provincial Meeting of Ministers of Agriculture, the Canadian Agricultural Outlook Conference held annually under the auspices of Agriculture Canada, marketing plans under the Farm Products Marketing Agencies Act, and the Federal/Provincial Market Development Council.

The institutional arrangements which exist in the agri-food sector dictate that continued provincial cooperation is vital to successfully achieving national development objectives. Certain of the proposals have been the subject of earlier federal/provincial consultations, e.g. Canagrex, Farm Credit, Energy Research, and Stabilization. Several of these have been strongly endorsed. The broad developmental thrusts proposed have also been discussed at the ministerial level (Annual Conference of Agriculture Ministers, Toronto, July 1980) and reaction was supportive.

## ALTERNATIVES

The alternatives to embarking on the comprehensive public sector agri-food strategy outlined in this paper are:

(i) to reduce federal involvement in the agri-food system; and

(ii) to maintain the status quo.

A strategy based on either of these alternatives would mean that the federal government had abdicated its responsibility to take the initiatives for developing the market opportunities inherent in the outlook for the world food demand and to work with the provinces to devise measures to deal with constraints to developing the agri-food sector.

Provincial governments would be left with the task of dealing with growing international opportunities and the spectrum of constraints which face the agri-food sector. Uncoordinated provincial programs for export market development and international agricultural development would be counter-productive, and provincial programs only would not be effective in dealing with the major constraints to the Canadian food system. The result would be multi-strategies for the agri-food sector with duplication of effort which could be wasteful. Furthermore, unilateral provincial strategies could lead to balkanization within the Canadian agri-food sector with uneven and uneconomic regional development inconsistent with that for which the resources would be best suited. To attain the benefits from the future market outlook requires federal leadership and federal-provincial cooperation and support as integral features of the strategy.

The end result would be that the private sector of the Canadian agri-food system would not be able to take full advantage of the potential opportunities inherent in the very favourable outlook for commercial exports. At the same time, Canada's ability to play a larger and more effective role in helping Third World Countries to develop their agricultural sectors would be diminished.

## CONCLUSION

The challenge to produce and the constraints that must be overcome require an agri-food strategy that:

(i) ensures adequate returns to farmers, processors, and others in the system; in other words, that there is reasonable assurance of profits under competent management; consumers will then be assured of adequate supplies of high quality food at fair prices and the export earnings of the sector will increase;

(ii) coordinates all activities interdepartmentally within the federal government, activities interdepartmentally between federal and provincial governments, and activities interprovincially and maintains liaison with the private sector and with international agencies;

(iii) expands, protects, and improves the natural resource base; and

(iv) provides the means to develop and adopt new technology to keep the products of the sector competitive in world markets and meet expanding demand.

An agri-food strategy has been outlined in the paper which identifies priorities for domestic and international policies and programs in marketing, upgrading the supply base, and research. The programs and activities within these areas will:

(i) provide mission-oriented research to enable the system to increase productivity and produce the kind and quality of products which meet market demand;

(ii) reduce risk and uncertainty and provide market incentives for productive investment;

(iii) emphasize commercial competitive market development with particular emphasis on export markets offering growth potential;

(iv) maintain and improve the quality of resources by preventing the degradation of land and water resources, by offering management and technical training, and by assuring that debt financing is consistent with business requirements;

(v) encourage restructuring of firms in the sector into viable economic units;

(vi) improve the infrastructure; and

(vii) as a by-product, help to enhance Canada's ability to play a larger and more effective role in international development, especially in contributing to the long-term solution of the global problem of food scarcity.

Eugene Whelan

Minister of Agriculture

# MARKET OPPORTUNITIES, SUPPLY POTENTIAL, AND GROWTH CONSTRAINTS FOR THE AGRI-FOOD SECTOR IN CANADA

## EXECUTIVE SUMMARY

This paper is concerned with the analytical bases for the conclusions expressed in the Discussion Paper, Strategy for the Agri-Food Sector, AGR-6-81-DP, July 9, 1981. In essence the Discussion Paper concluded that the evidence supported the adoption of an agri-food strategy which would be oriented to marketing and growth and would provide programs to cope with constraints which could otherwise dampen the supply response and lessen the market opportunities. This paper provides the empirical dimensions of the market opportunities, the agri-food supply potential, and the constraints which impact on the demand-supply equation.

## MARKET OPPORTUNITIES

### 1. The World Setting

The results of long-term commodity forecasts portend a world market for food which can be exploited to make agri-food a significant growth sector in the Canadian economy. These studies conclude that food prices must rise in real terms because growing world population and per-capita incomes will create demand, while world supply will be constrained by shortage of new arable land and serious degradation of the existing natural resource base.

Global 2000, a comprehensive recent study, concluded that the growth in the demand for food, which will average 2.2 percent per annum from now to 2000, can only be matched on the supply side by large increases in the use of petroleum-based inputs, particularly chemical fertilizers. Therefore, to produce the required output of food will entail using increasingly expensive inputs applied to scarce and deteriorating land resources.

Features of these projections of particular interest to Canada for an agri-food strategy are:

- Using moderate demand and supply assumptions, Global 2000 projects the real price of food commodities to increase in a range of 21 to 63 percent between 1975-77 and 2000 (0.75 to two percent per annum) depending on a range of energy prices from constant to high.

- The growth and demand for food in the developed world will be largely generated by income growth from a level that is already high. In less developed countries (LDCs), population growth will be the dominant force creating more demand for food but per-capita demand is also projected to grow by nine percent from 1970 to 2000. Even so, the number of persons in the world whose food intake will be below minimum requirements set by FAO will increase from 500 to 1200 million from now to 2000.

- The potential for severe regional food shortages including even famine will become greater.

- Year-to-year variations in crop production will increase due to bringing land in weather sensitive zones into production. This portends even greater fluctuations in food commodity prices in world markets.

2. Export Market Development

Grains and oilseeds have been the mainstay of Canadian agricultural exports world-wide and the greatest increase in exports can be expected in these commodities.

Prime opportunities exist to export Canadian agri-food products to oil-rich countries (Mexico, Venezuela, Nigeria, Algeria, Saudi-Arabia); to the European Economic Community, in particular West Germany, France, and the United Kingdom; and Asia (Japan, China, and South Korea). Principal commodities involved are swine meat, grain corn, rapeseed oil, poultry meat, breeding cattle, breeding swine, and pulses.

The demand will increase for both meat and breeding stock as growing incomes permit populations in developing countries to shift from a predominantly cereal diet to one with more meat protein. Some countries will depend on the international market for coarse grains to feed a larger livestock population, as have Russia and other East European countries. The market for vegetable oils will continue to increase, particularly in the countries with large population growth.

3. Import Replacement

Considerable potential exists for reducing Canada's dependence on food imports such as apples, fresh vegetables, oilseeds, oats for milling, breakfast cereals, and beef. For example, over 25 percent of the apples consumed in Canada are imported. Replacement would involve creating Canadian varieties which are acceptable to consumers. There is a potential for economical storage systems for fresh vegetables to reduce imports when Canadian products are not in season. The potential to replace out-of-season fresh vegetables with frozen products produced in Canada is good. Research can develop varieties of soybeans adaptable to Canadian conditions to replace imports. Range beef utilized by certain fast-food outlets is a potential import replacement.

4. Non Commercial Markets

In addition to exploiting commercial markets for food and agricultural products, Canada has an obligation to assist in the resolution of global food shortages. As outlined in CIDA's Strategic Overview, an increased percentage of Canada's higher ODA levels over the next few years will be devoted to the agricultural sector. In the 1980s proportionately more of this assitance will be directed at helping to stimulate the efforts of selected Third World Countries to become more self-sufficient in terms of meeting the basic needs of their populations for food and safe drinking water.

## SUPPLY POTENTIAL

1. Method of Calculation

From an econometric model the impact of potential international real price increases for food commodities of 0.75 to two percent per annum on Canadian domestic food demand, agri-food production, and net export surplus was calculated. The model was based on previously estimated technical and economic interrelationships and trends. Underlying assumptions were continuation of the historical evolution of industry structure, producer expectations, policies, input-output price relationships, and economic policy. The model also assumed that availability of export markets, adequacy of the infrastructure, and the supply of purchased inputs would not be constraints.

2. Domestic Demand

During the period 1975-77 to 2000 under the assumed growth of population, income, and the increase in the real prices for food, total consumer expenditures can be expected to rise 117 percent (3.1 percent annually), while expenditures on food consumed at home can be expected to rise 65 percent (two percent annually) under the low price scenario and 51 percent (1.7 percent annually) under the high price scenario during the 25 year period. The largest increases in the quantity of food consumed would be beef, fruits, and vegetables, but there would be significant decreases in the consumption of cereal and bakery products.

3. Production Potential

Production potentials were obtained from the model by assuming continuing output trends from productivity and expanded use of inputs and by estimating the long-term impact of real price increases. Expanded acreages and yields in Western Canada would increase grain and oilseed production potentials by 77 - 100 percent (2.4 - 2.8 percent annually) from an additional six - million acres. Total Canadian grain and oilseed production potential would be up 86 - 107 percent (2.5 - three percent annually) during 1975 - 2000.

If dairy and poultry supplies expand to satisfy only domestic requirements, the model estimated that production would increase approximately 50 percent under low prices and 30 percent under high prices during 1975 - 2000. However, opportunities to export poultry, which would increase the supply requirements, may develop.

Beef and pork production could be expected to expand rapidly despite higher feed costs. Pork would be more sensitive than beef to high grain prices, reflecting both the higher input cost and the opportunity to market grain. Beef production was projected to rise 115 - 136 percent (3.1 - 3.5 percent annually) and pork production by 94 - 102 percent (2.7 - 2.9 percent annually), slightly lower in the West than the East.

Total agriculture sector output could be expected to increase 79-90 percent (2.4 - 2.6 percent annually), which is close to the growth rate in the index of agricultural output 1961-73.

4. Export Potential

The export market will provide the largest future increase in demand for the Canadian agri-food sector. The surplus potential of the sector above domestic requirements, therefore, is the critical dimension for a growth-oriented strategy. The surplus potential was estimated by subtracting the domestic demand requirement from the potential supply response as calculated above, both of which took into account positive changes in the terms of trade for agri-food commodities at the rate of 0.75 to two percent per annum.

Because of the multitude of factors affecting net exports of livestock and grain, the actual mix of commodities over a 25-year period could vary greatly from the projections. Nevertheless, given the projected level of grain production, there is a significant potential to expand exports of grains or livestock or a combination of both. Evolving comparative advantage in livestock feeding, domestic and foreign agricultural policies, and producer expectations will determine the distribution of agri-food products which Canada will export.

## GROWTH CONSTRAINTS

The evidence on market potential and the Canadian supply potential supports the adoption of an agri-food strategy with a strong marketing thrust and oriented to growth of the agri-food sector. There are, however, constraints which would dampen the supply response by discouraging entrepreneurs in the agri-food sector to invest and produce. An essential feature of the strategy will be to provide public policies and programs to mitigate the impact of the constraints listed below.

1. Short-Term Commodity Price Variability

Price variability arises from the impact of large variations in production from one period to another. This is due in part to variations in yields due to natural hazards, particularly weather, which trigger even greater price changes. Producers then tend to over-respond, thereby generating cyclical price variations.

Price instability is a constraint to growth because it means price uncertainty to producers, causes great variability in

income flows, and induces resources to periodically flow in and out of production. Instability flows through the system causing instability in employment and income in machinery manufacturing and processing. An example of price instability for one commodity is illustrated in the attached chart of monthly average price of hogs, Toronto, 1961 to 1981.

2. Natural Hazards

These are a major dimension of instability and uncertainty for the individual producer in the primary sector and constitute a serious constraint to production management and financing. In the prairie region, the average yield of wheat during the period of 1950 - 1976 ranged from 710 to 2000 kilograms per hectare. Near crop failures in tree fruits occur once or twice a decade and potatoes are notoriously subject to fluctuations in yield. Crop losses from insects, diseases, and weeds aggregate to approximately one-third of the annual production in Canada. In livestock, death losses per thousand animals amount to 45, 74, and 128 respectively for cattle, swine, and sheep.

3. Inadequate Levels of R & D in Production and Processing

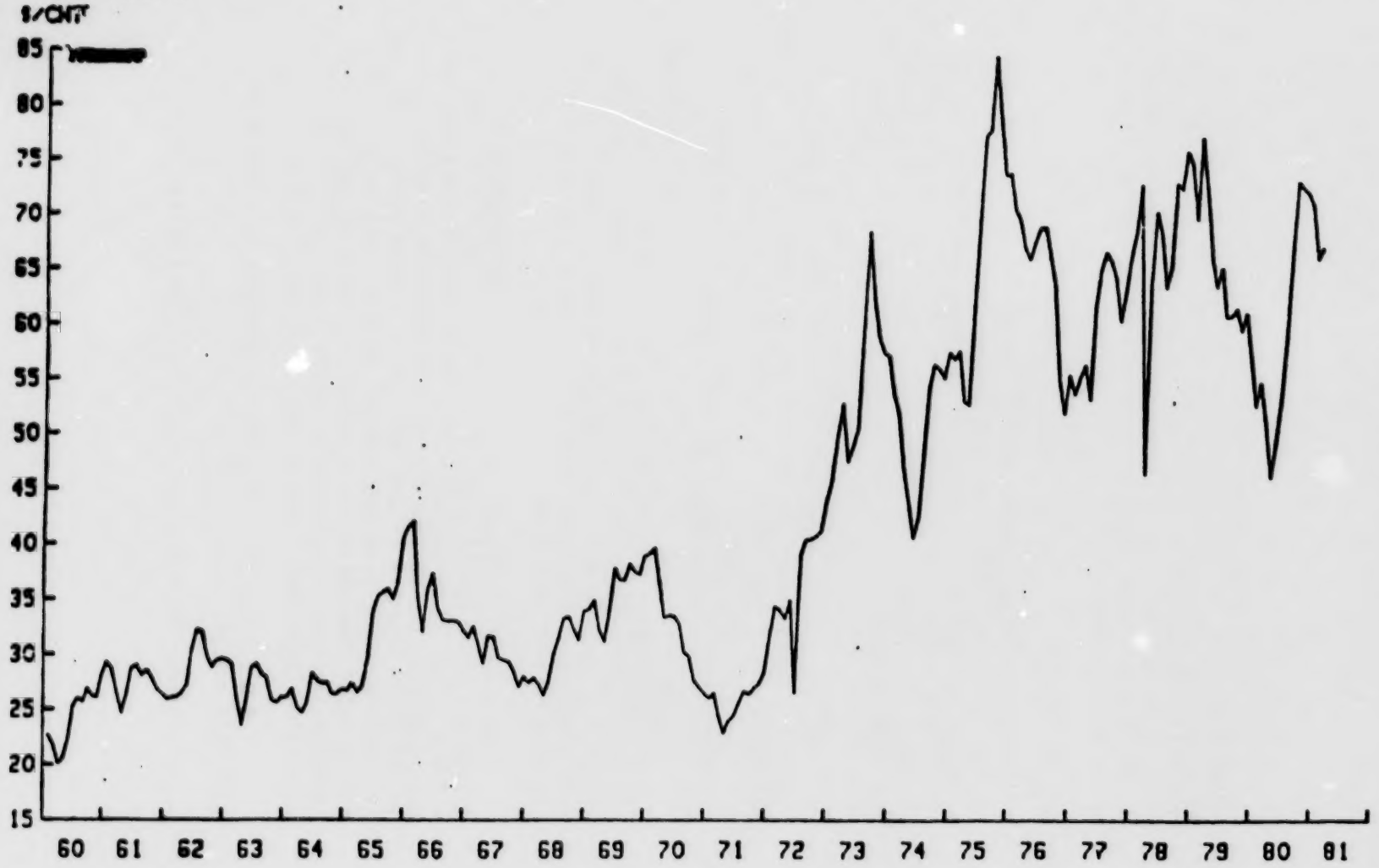
Most R & D has to be publicly funded because most Canadian-owned food-processing firms and farms are too small to maintain research facilities, multinationals carry out research abroad usually not attuned to Canadian requirements, and much R & D for food products is long-term, with significant social benefits external to a private firm.

Because of inadequate support of research, Canada has missed the advantage of leadership in certain products. For example, delay in developing winter wheat of sufficient hardiness has restricted the development of this otherwise superior crop. Insufficient research on pest management systems prevents the use of potentially valuable pest control methods, particularly the biologicals. New varieties of crops (Granny Smith apple), improved livestock (year-round breeding sheep), and changes in production technology (zero tillage) await development.

R & D funding is inadequate on important problems which constrain output. Examples are:

- stress on crops from drought and low temperature;

MONTHLY AVERAGE PRICE OF INDEX 100 HOGS, DRESSED, TORONTO




SOURCE: AGRICULTURE CANADA LIVESTOCK AND MEAT TRADE REPORT



ANNEX

- soil salinity now affecting close to 10 percent of soils in the prairie region;

- loss of organic matter;

- nitrogen fixation by natural processes (one-third of existing nitrogen in prairie soils has been used in crop production);

- technical and economic management to reduce summerfallow area from 25 to 10 percent in the Prairie Region would have a high payoff in output and conservation;

- energy efficiency which needs to be increased by 25 to 50 percent;

- import replacement of about 23 percent of the consumption of fruits and vegetables that can be produced in Canada;

- 60 million hectares of land now unused with some agricultural potential;

- alternatives to chemicals for pest control;

- enzymology and fermentation largely unexploited in food processing; and

- agricultural waste which amounts to over 200 million tonnes of material annually.

Research expenditures in food and agriculture have not increased in proportion to the growth of GNP in contrast to major competitors such as the United States and Japan, where proportions are two or three times greater than in Canada.

4. Environmental Damage

The impact of the environment on the potential of food production is difficult to assess. Examples are:

- the extending urban environment has caused 200,000 acres of farm land to be taken out of food production in Ontario alone during 1966-71;

- Sheet and rill erosion is serious in row crops in eastern Canada and amounts to a loss of 13,000 acres per annum in Ontario alone;

- Atmospheric ozone from Detroit has caused $25-million-worth of damage to Ontario tobacco production;

- Salinity affects 10 percent of the land under cultivation in Saskatchewan and 20 percent of the land in Alberta;

- Acid rain constitutes a potential threat to agricultural production;

- Agricultural production methods depend heavily on the use of pesticides to control diseases, insects, and weeds; these materials often pose threats to the environment; more detailed knowledge is required to develop public policy and farm practices for effective control through an integration of chemical and biological control measures.

5. Rising Real Costs of Petroleum and Petroleum Based Inputs

Since 1973, the proportion of petroleum based input costs in farm operating expenses has increased from 19 to 25 percent. The use of fertilizer in crop production has increased from one to 1.46 million tonnes from 1973 to 1980. Expenditures on pesticides 1973 - 1980 increased from $78 to $115 million (1971 dollars). Higher energy costs will increase transportation costs, which are dependent on fossil fuels. In 1973, the transportation sector accounted for 25 percent of total energy used in Canada. In 1979, the proportion was 30 percent. Transportation costs represent about 30 percent of the final price of fertilizer. The use of fuel and electricity by the processing sector increased from 102 to 106 petajoules from 1973 - 1978.

6. Market Competition

a) International: On the supply side there is growing competition from subsidized supplies from the European Economic Community and from expanding exports from the more advanced developing countries such as Brazil and Argentina. On the demand side there are non-tariff barriers such as variable import levies, quotas, health and sanitary regulations, and

packaging and labelling requirements. Non-tariff barriers are particularly significant in the case of grains, dairy products, and beef. The development of bilateral contracts with centrally planned and developing countries tends to cause the residual free market to shrink and hence to become more volatile.

b) Market Promotion - Provincial Initiatives: Several provinces promote the export of agricultural commodities. This creates a competitive element among provinces which is detrimental to overall trade development for Canada. Examples of this problem include sales of Canadian pork to Japan during the '70s when provinces went independently to Japanese buyers, and, currently, sales of cattle and swine, livestock, and genetic materials to Mexico, as well as large-scale dry-land, rangeland projects in China. For the benefit of the Nation, federal and provincial initiatives must be co-ordinated.

c) Marketing Mandate of Foreign-Owned Subsidiaries: Foreign - owned plants account for 34 percent of industry shipments in the food and beverage sector as a whole and the share of foreign-owned plants was over 60 percent in fruit and vegetable canning and flour and breakfast cereals. There is a concern that foreign-owned firms might not compete directly against their parent firms in third markets. The management philosophy of multinational firms can vary significantly in the degree of independence and autonomy granted to subsidiaries.

7. Regional Self-Sufficiency

Provincial assistance to producers to attain a greater share of agri-food self-sufficiency within the province can result in unfair advantage over these in another province and uneconomic regional distribution of the industry. For example, many provinces provide unilateral assistance to the agri-food sector. Provincial stabilization programs and credit assistance and capital grants under the DREE Subsidiary Agreements vary in terms of eligibility criteria and the amounts of assistance available. An agri-food strategy needs to contain a strong federal leadership with even-handed policies to ensure that production develops where it enjoys the greatest comparative advantage.

8. The Natural Resource Base

Total land area being farmed in Canada amounts to 69 million hectares. An additional 60 million hectares have some capability for food production, but less than five million have significant production potential. Constraints to bringing more land into production are primarily unfavourable climate and poor soil.

Problems with existing land base include salinization affecting nearly 10 percent of the cultivated land in the prairie provinces, loss of up to 50 percent of the organic matter in many soils, inadequate natural moisture, inadequate drainage, oxidation of organic soils, and loss of prime agricultural land to urban use.

9. Structure of Business Units

a) The Primary Sector: There are about 300,000 farm units with average asset value of $183,000. Many of these are not of the size to achieve the optimum return to resources due to undercapitalization. There are great differences in the financial structure of farms. On the average, the equity amounts to 80 percent but ranges from a very small percentage to 100 percent equity.

The range of technical sophistication is very wide among farm entrepreneurs and many need technical assistance and advice.

b) Secondary Sector: The food and beverage processing industry operated 4535 plants in 1978 and shipments were $22 billion, which was 17 percent of total manufacturing shipments. Employment was 229,906 persons, 12.8 percent of manufacturing employment. Of these, 46 percent employed fewer than 10 persons, while 50 establishments (1.1 percent) had more than 500 employees. In terms of performance, output increased 2.1 percent per year compared with 3.5 percent for all manufacturing in Canada. Employment likewise increased more slowly, 0.3 percent versus one percent. Labour productivity increased 1.8 percent versus 2.5 percent. Unit labour costs increased 9.4 percent versus 7.8 percent and the number of establishments declined more rapidly, minus 3.7 percent versus minus-one percent. Constraints on the industry are certain aspects of government regulations, the relatively short season for most crops requiring plant capacity large relative to annual throughput, and the geographical dispersion of production and consumption which adds to transportation and distribution costs.

10. Assistance to Less Developed Countries (LDCs)

During the 1970s, Canada's Official Development Assistance (ODA) ranged from US$346 million in 1970 to US$1036 million in 1980. In relation to Gross National Product (GNP), ODA varied from 0.42 percent in 1970 to 0.54 percent in 1975 and to 0.42 percent in 1980.

In recent years Canada's ODA has been channelled through four primary programs: Bilateral, Multilateral, Special Programs, and the International Development Research Centre (IDRC).

Approximately half of Canada's ODA is disbursed through CIDA's Bilateral Programs. Agricultural and rural development projects, including bilateral food aid, fertilizers, and rural infrastructure, currently account for 30 to 35 percent of total Bilateral Program aid. This involves over 150 projects. Food aid consisted of approximately $188 million last year (15 percent of ODA), while many experts worked in developing countries in the renewable resource sector (agriculture, fisheries, and forestry). Fertilizers and other agricultural commodities were also provided under ODA. The balance of the Bilateral Program assistance in the agricultural sector consisted of Canadian goods and services, the provision of academic and physical training for specialists from developing countries, and a contribution to the local costs of some projects.

Multilateral Program assistance in recent years has ranged from 43 to 36 percent of ODA; in 1978-79 it was 40 percent. Multilateral aid consists primarily of grants and contributions to some 80 international institutions ranging from $10 thousand to $170 million. With the exception of food, which is contributed to several multialteral agencies such as the World Food Program, the International Fund for Agricultural Development, and the United Nations Relief and Welfare Agency (UNRWA), etc., multilateral aid primarily consists of untied cash contributions. Last year, food aid provided through multilateral channels consisted of $98 million or 20 percent of Multilateral Program disbursements. Many of the international agencies which Canada supports are primarily engaged in the agricultural sector.

CIDA also provides assistance to developing countries through its Special Programs (i.e. Non-Governmental Organizations (NGOs), Industrial Cooperation, etc.). Last year, approximately

eight percent of Canadian ODA was channelled through these programs. A significant proportion of the projects undertaken by NGOs involve rural development and agriculture. In addition, some $6 million in food aid was provided to developing countries through the projects funded by Canadian NGOs.

Approximately three percent of Canada's ODA is disbursed by IDRC. About 30 percent of IDRC's budget of $36 million last year was devoted to the agricultural sector, involving some 60 projects.

International experts are not optimistic about the global food situation in the next 10 to 20 years. Most experts are predicting that population increases, primarily in Third World countries, will continue to outpace growth in the production of food. As a result, there are likely to be several serious crises before 2000 as global food production and reserves are inadequate to meet even the basic minimum demands of millions of people in developing countries. With the slowdown in the world economy, higher costs of energy, and unfavourable terms of trade, a number of developing countries will not have the funds to purchase essential foodstuffs even if there are no serious crop failures or natural or man-made disasters. At the same time, it is not feasible to believe that the countries which are traditionally able to export food can produce enough to meet the basic global needs or that sufficient concessional funding will be available to finance such a large-scale volume of food aid.

11. Transportation and Handling

Large private and public investments will be required in transportation and handling facilities during the '80s. These will include $14 billion in the rail mode, $600 million in the laker fleet, $750 to $1000 million to rationalize and modernize the country grain elevator system, increased capacity in the eastern transfer elevators, and additional cold storage for winter storage of fruits and vegetables.

Inadequate rates of tariffs need to be corrected in order to attain productivity improvements. The continuation of the fixed statutory rates on western grain movement represents a serious threat to agricultural development and balanced growth. These rates, if continued, could prevent achieving larger export volumes. Statutory rates also keep grain prices higher in the prairies and discourage the development of the use of grains and oilseeds as an input to livestock feeding and processing.

12. Supply of Long-Term Capital

Private investors do not offer long-term fixed interest rate mortgages, which makes long-term commitments in agricultural production uncertain in the light of recent dramatic increases in interest rates. Interest rate levels and uncertainty combined with the variability of farm cash income from year to year greatly increase the risk of financial failure in farm production. Efficiency in agricultural production will be associated with the use of ever larger and more expensive machinery on farm units of steadily increasing land area. These, coupled with upward pressures on land prices, point to the need for substantial capital to enter farming and attain appropriately sized farm units. Productivity and output of the farm sector will be constrained in the absence of substantial government involvement in the provision of long-term financing.

## MARKET OPPORTUNITIES FOR CANADIAN AGRI-FOOD SECTOR

1. Global Demand-Supply Scenario for Food

There is growing consensus that Canadian agriculture may be emerging into an era of much higher growth, propelled from the export sector. This scenario is based on a number of long-term international commodity forecast studies. The key conclusion from these studies is that agricultural prices must rise in real terms, based on the forecast that demand from rising world population and per-capita income will continue to grow rapidly, while food production on the other hand may have difficulty keeping pace because of declining availability of arable land and water, serious degradation of natural resources, loss of native genetic strains of crops, increased requirements for high-cost energy-related inputs for new food-producing technology, and new production areas that are more sensitive to the vagaries of the weather. The extent and timing of the price increases depend on various assumptions respecting population growth, income growth, yield increases, and energy prices.

a) Food Price Forecasts: A recent projection of agricultural commodity prices is contained in the Global 2000 Report to the President of the United States (1980). This report presents three alternative scenarios. Alternative I, the

most likely scenario, assumes a medium population and income growth and yield increases similar to the past 25 years. Two levels of energy prices were used -- constant and more than a doubling of real prices by 2000. Alternative II is the lower bound scenario using low population and high income growth, high grain yields (one standard deviation above Alternative I), and constant real energy prices. Alternative III is the upper bound, using the higher population and lower income growth, low grain yields (one standard deviation below Alternative I), and high energy prices.

Table 1 shows the increase in food prices forecast for the year 2000. In the year 2000, food prices under Alternative I would be above 1975-77 levels by 21-63 percent. The upper bound scenario would have food prices 79 percent above 1975-77 and the lower bound scenario would have food prices 8 percent above 1975-77. In all of the scenarios, the real price of agricultural products would be higher in 2000 than in 1975-77, although most of the increase would occur between 1985 and 2000. It should be noted that the 1975-77 prices were 27 percent below the 1972-74 peak prices but 20 percent above 1969-71 prices.

TABLE 1. Global 2000 Forecast

| | Real Price Increase for Food: 1975-77 to 2000. |
|---|---|
| | - percent change - |
| Scenario I - Most Likely | |
| - constant energy prices | 21 |
| - high energy prices | 63 |
| Scenario II - Lower bound | 8 |
| Scenario III - Upper bound | 79 |

b) Demand Factors: The Global 2000 report forecasts (medium series) that world population is expected to grow at a 1.8-percent rate for 1980-1995 and 1.7 percent during 1995-2000.

Most of this growth will be in less developed countries (LDCs) as their growth rate will be three to four times the developed countries' rate. The world population will be 55 percent larger by 2000 from 1975 levels. Of the 1975 world population of 4.09 million, 72 percent were in developing countries. This will rise to 79 percent by 2000 for the estimated 6.35-billion world population.

Economic growth as measured by Gross National Product (GNP) is expected to fall between the high growth period of 1960-72 and the slow growth period of 1972-76. Global 2000 forecasts a high and low rate of growth for 1976-85 and 1985-2000 for various categories of countries. In most cases, the slow growth income forecast exceeded 1972-76 levels, but the high forecast was below 1960-72. For middle income LDCs, however, the high growth rate forecast for 1976-86 exceeds even that of the 1960-72 period.

Income growth expressed on a per-capita basis is expected to be higher for the OECD countries than for the LDCs. Therefore, the income disparity between industrialized countries and LDCs is projected to increase during 1976-2000.

c) Supply Factors: On the supply side, limited areas of land suited for agricultural development and high-cost energy will be major constraints on food production. Global 2000 emphasizes that most land remaining in the world that might be brought under cultivation is of low productivity. Moreover, serious loss and degradation of developed agricultural resources are taking place at a rate that could seriously affect the world's food supply potential. Global 2000 lists soil erosion, loss of nutrients and soil compaction, salinization of land and water, loss of high quality land to urban development, increasing air and water pollution, and the extinction of local and wild crop strains needed by plant breeders as components of the resource degradation problem. Global 2000 also projects a high-cost energy scenario, particularly in the supply of petroleum, so that the relative cost of inputs dependent on petroleum will increase substantially.

d) Conclusions: Global 2000 concluded that the growth in the demand for food, which will average 2.2 percent per annum, can only be matched on the supply side by increasing

relatively the use of petroleum-based inputs. Therefore, to produce the required output of food will entail using increasingly expensive inputs with a scarce and deteriorating land resource. As a result, Global 2000 predicts that the real price of food will most likely increase by 21 to 63 percent between 1975-77 and the year 2000.

e) Highlights from the Most Likely Scenario of Global 2000:

i) The growth in demand for food in the developed world will be largely generated by income growth from a level that is already high. The population growth in countries within that region will be relatively small.

ii) The increase in per-capita demand for food in the lesser developed countries is projected at nine percent from 1970 to 2000. However, the variation among the countries within the region is large and the number of people whose food intake will be below the FAO minimum requirement level will increase from 500 million now to 1,200 million by 2000 A.D.

iii) The potential for severe regional food shortages, including even famine, will become greater as population increases and the natural resource base deteriorates.

iv) The potential for major year-to-year variations in world crop production will increase as land in more weather-sensitive zones comes into production and as a larger area of high-yielding genetically identical crops is grown. This potential introduces a higher degree of uncertainty in agricultural commodity markets and portends even greater fluctuations in commodity prices.

v) The terms of trade of food will be increasingly favourable to food production.

vi) The terms of trade for inputs will favour the development of a yield-increasing, energy-saving technology.

vii) The prospects for resource degradation will place emphasis on resource conservation.

2. Country and Product Identification of Market Opportunities

The global demand supply scenario for food appears favourable to the expansion of some elements of Canadian agriculture. Export-led growth may be expected to benefit producers of grains and oilseeds, pork, pulses, and purebred livestock. The following section identifies key market opportunities by country and by product.

a) Export Market Development: Canada already enjoys considerable success as an exporter of agricultural commodities and food products. In recent years, Japan, the European Economic Community (EEC), and the United States have been our most important markets, accounting for approximately 57 percent of Canada's agricultural exports. The Union of Soviet Socialist Republics (USSR) and China have remained important markets for grain since 1975 and the recent agreement to supply the USSR with grain over the next five years should boost that country into the number one spot as a market for Canadian agricultural commodities.

Ongoing efforts are required to maintain and, if possible, expand our market shares in Japan, the EEC, and the United States (USA). New marketing efforts in keeping with the Canadian Export Development Plans for these priority countries will also be undertaken. Recent moves to diversify Japanese agriculture, the continuing access problems caused by the Common Agriculture Policy (CAP) of the EEC, and the economic recession in the USA have tended to slow the volume of our exports to these markets. The rate of growth of our exports to these markets over the next 20 years may not be as rapid as it was during the late Seventies. Our ability to expand exports to these markets will be very dependent on the timing and nature of economic recovery in the industrialized economies. The continued strength of demand for grains and oilseeds, which together with their products account for approximately 60 percent of Canada's agricultural exports, will maintain the momentum of the prairie grain economy for the foreseeable future. Well over half of Canada's wheat and flour exports are made to countries with centrally planned economies. The prospects for oilseed exports will also be bright, providing markets in addition to Japan, the EEC, and India for rapeseed, rapeseed oil, and rapeseed meal.

Opportunities for rapidly developing markets for Canadian agricultural products exist primarily in countries which have oil available for export and which have large and growing populations. Mexico and Algeria are particularly promising in this regard in the short term. Other markets of considerable promise are the rapidly industrializing nations such as Brazil, South Korea, and the member states of ASEAN.

The main strength of Canadian export performance in the agricultural field will continue to be provided by the grain and oilseeds sector. In addition, export market demand will grow for products such as pork, beef, pulses, and purebred livestock. Canadian producers are already well placed to service this demand and exports of these and other products could expand significantly over the next 20 years.

Changing world trade patterns, however, will force Canadian producers to adapt the output to markets which demand products differing to some degree from those produced in the past. Increased demand for feed grains may result in greater exports of barley and grain corn. Canada's reliance on hard, red spring wheats may have to give some ground to medium-quality wheats if Canada wishes to export wheat to markets which do not consume western-style breads. Demand for animal protein is expected to grow in nations where personal incomes are rising. This development is unlikely to result in major opportunities for meat exports unless the Canadian products become more cost competitive, but it could lead to increased demand for breeding stock. The general upgrading of patterns of food consumption within certain developing countries, which often accompanies increasing urbanization of the population, will ensure growing demand for foods which are often more readily obtained by importing rather than from local production. Shifts from rice and maize to wheat, the introduction of intensive livestock production systems, and increased consumer awareness of different foods are developments which may favour increased exports of agricultural products from Canada.

Many of these opportunities could be realized providing the Canadian agri-food system remains competitive. Export markets are, in general, very sensitive to prices and sales of many commodities can only be made if Canadian products can match the world price, over which Canada has little

influence. If Canada can compete on a price basis, it will also be necessary to ensure that the quality characteristics of our products match those required by the target markets. The need to ensure adequate transportation facilities must also be recognized, as the availability and cost of this essential link in the marketing chain will be increasingly important in the years to come.

Opportunities also exist to develop markets through the provision of agricultural technology both on an aid and on a commercial basis. The adoption of western agricultural systems in many developing countries should lead to a growing demand for complete facilities for production and processing. The supply of such systems to client nations will not necessarily lead to ongoing demand for Canadian supplied products other than breeding stock. However, the pursuit of this type of opportunity will provide a valuable exposure of Canadian agricultural techniques to potential customers and could lead to increased awareness of Canada as a supplier of a wide range of agricultural products.

b) Import Replacement: Considerable potential exists for reducing Canada's dependency on imports of selected products such as: apples, fresh vegetables, oilseeds, grains (oats for milling, breakfast cereals), and beef.

Currently, over 20 percent of the apples consumed in Canada are imported. When a satisfactory Canadian variety is developed that replaces the Granny Smith, apple imports can be reduced. Work continues on developing specialized storage systems for fresh vegetables to further reduce imports of U.S. vegetables when the Canadian product is not in season. Additionally, the potential to replace out-of-season imported fresh vegetables with frozen Canadian is also good. Canada is a net importer of soyabeans, and research is underway to develop varieties which are more adaptable to Canadian conditions, particularly in Western Canada, which can replace the imported product. Range beef, which is utilized by many fast-food outlets, is another major challenge for import replacement of the product from Oceania.

c) In addition to its commercial exports of food and agricultural products and services, Canada plays a signficant role as a source of concessional funding for developing countries.

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Canada is traditionally among the eight largest western donors in terms of its ODA expenditures and ODA/GNP levels. However, in addition to the goods and services purchased in Canada under CIDA's aid program Canadian processors and agri-business have an opportunity to compete in the multi-million-dollar annual market for food and agricultural products and services, financed concessionally by other donors and multilateral agencies.

## CANADA'S SUPPLY POTENTIAL BY 2000 A.D.

### 1. Background

Global 2000 presented three scenarios for agri-food commodity prices by 2000 A.D. The most likely scenario, which took into account high and low energy prices, gave a range of real agri-food prices increases, 1975-77 to 2000, of 21 to 63 percent. This implies an average rate of change in terms of trade for agri-food commodities of 0.75 to two percent per annum. This range was accepted for the analysis of production potential. Hereafter, these lower and upper limits are referred to as low and high changes in output prices.

The implications for the agri-food sector from a secular upward trend in terms of trade of its output are significant. In particular, it would enable the sector to make a greater contribution to Canadian balance of trade and to some extent contribute to growth in employment, GNP, and productivity. In an international context, Canada is already a major food exporter and domestically possesses a significant potential for expansion, given appropriate economic incentives.

### 2. Procedure

Results from previous research were used to determine the long-term impact on Canadian supply, demand, and trade for the agri-food sector from these increasing real prices. The procedure was:

i) examine domestic food demand by commodity to the year 2000;

ii) estimate long-term commodity supply response; and

iii) from these derive the excess commodity supply available for export.

For commodities where information indicated different regional production responses to price, the production estimates were made for Eastern and Western Canada.

3. Assumptions

i) No major changes in the trends recently established for tastes and preferences for food will occur.

ii) Productivity change in agriculture will continue at about the same rate as observed in the post-war period.

iii) World prices will be translated into domestic markets.

iv) Export markets will exist for these commodities produced either commercially or through food aid sources.

v) No change in the current Canadian foreign exchange rate will occur; if the Canadian dollar appreciates as is generally anticipated, the lower Canadian prices will impact on both the domestic demand and supply potential and consequently reduce the export surplus as forecast in this analysis.

High energy prices have been included in the production response forecast by lowering high commodity prices (the high energy cost scenario) which the producer receives by four percent for livestock, six percent for crops in Western Canada, and nine percent in Eastern Canada. The high energy prices have not been explicitly included in the demand model. Consequently, Canadian income and commodity demand are overestimated slightly for the high price scenario.

4. Domestic Retail Food Demand

The basic elements affecting domestic food demand in the long run are food and non-food prices, consumer disposable incomes, and population growth. Consumer responses to food prices and incomes in the aggregate are relatively small.

Using a macro-econometric model[1] developed for Agriculture Canada which includes detailed links to food consumption, a 25-year projection was made from 1976 to 2001 for the Canadian economy and per-capita food consumption by major commodity group.

To convert the accepted commodity price increases to the retail level, only the farm value portion was increased. Thus, the farm-to-retail marketing margins were assumed to remain constant in real terms although the level of these margins is influenced by a number of factors in addition to commodity prices. Under these conditions, retail food prices on the average would increase eight and 24 percent, but increases would vary substantially by commodity.

Population in 2001 was forecast at 30.7 million, a 33-percent increase over 1976.[2] Consumer disposable income was forecast to increase in real terms by 106 percent.[3] Consumer expenditures were forecast to rise 117 percent. Expenditures on food (food at home) were expected to rise 65 percent under the low price scenario (retail food prices up eight percent) and 51 percent under the high price scenario (retail food prices up 24 percent) over the 25 years. Thus, the proportion of consumer expenditures allocated to food consumed at home would decline through time.

Under the low price alternative and the assumptions of fixed preferences and past trends, per-capita consumption would change as follows: beef, 85 percent increase; fruits and vegetables, 10 percent increase; little change in other meats, poultry, and dairy; and a sizeable decrease of 24 percent in cereal and bakery

[1] F.T. Denton and B.G. Spencer, Food Demand and Nutritional Requirements in Canada: An Economic Demographic Model with Projections for the Period 1976-2001, Agriculture Canada Publication No. 79/8, June, 1979. The model contains a demand component for 27 food commodities which includes both growth and substitution effects for each commodity.

[2] This is similar to Statistics Canada Projection 1 in Population Projections for Canada and the Provinces 1976-2001, Catalogue No. 91-520, February, 1979.

[3] This forecast used a slow technical progress assumption term forecast which is consistent with recent Informetrica forecasts for 2000.

products. Under the high price alternative, the main difference would be a smaller increase in beef consumption (67 percent) and a smaller decline in cereals (19 percent).

Consumers, on average, would still be obtaining sufficient calories and protein above minimum nutritional requirements (although substantially reduced from current levels). The distribution of that reduction in calories and protein, however, may not be uniform and those persons on low and fixed incomes spending a large percentage of their income on food could face problems of purchasing an adequate diet.

5. Long-Term Supply Projections

The main determinants of increased agricultural production in the long run are the adoption of new technology and the type and level of input use. Technological change includes genetic improvements in livestock and crops, new chemicals, and more efficient machinery. These changes are expected to continue to be developed and introduced at the same rate as in the past. Upgrading of labour skills through education and training, particularly in management, is also expected to continue. A large change is assumed to continue to come from increased use of capital inputs (machinery, buildings) and operating inputs (e.g. fertilizer, chemicals, fuel). In addition, new land is available to be brought into production and the reduction of summerfallow in the West could add to the area in crops.

For the production forecast, input supply was not considered to be a limiting factor. It was assumed that past trends in input use and upgrading will continue and that additional inputs can be acquired. Under the above assumptions, the basic trends in production were assumed to continue, modified by responses to changing real prices estimated from historical responses.[4]

One of the limitations of the estimation procedure for supply response is that the quantitative relationships were adapted principally from short-term forecasting studies. Extending these results to a 25-year horizon leads to some inconsistencies.

[4]Implicit in this analysis is that farm costs (excluding energy) are expected to remain constant in real terms or bear the same relationship to output prices as in the past.

a) Grains: Studies which have examined the supply response in Canada of grains to higher prices generally show a very small response to higher prices in the short run but considerably larger in the longer run. Most of these studies used nominal or current prices.

For Western Canada, the estimated elasticities (percentage acreage response to a one-percent change in price) vary considerably. For this analysis, elasticities of 0.2 and 0.6 were chosen as the short-and long-run responses of grain acreages to price. These estimates may be biased downward because western grain producers have been operating under marketing quotas for most of this period (1960s and 1970s). Yield of grains per acre also responds to price with an elasticity of 0.15.

In addition to the price effects, annual increases in grain yields per acre have been about 2 percent as a result of factors such as genetic improvement, more purchased inputs, and better management. Agronomists estimate that in the next decade genetic improvements should increase prairie yields by 0.5 percent for CWRS wheat, one percent for durum wheat, two percent for utility wheat, 3.5 percent for triticale, and one percent for barley, oats, and rapeseed.[5] However, using more marginal land and reducing summerfallow will likely reduce yields. In estimating future production, yields on new lands were reduced by 20 percent.

Econometric projections using the acreage and yield elasticity values and price increases of 21 and 57 percent[6] over the 25-year period showed an increased area of six to 17 million acres and production increases of 77 to 100 percent for grains in the West (Table IA).[7]

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[5]Proceedings of Prairie Production Symposium, Saskatoon, October, 1980.

[6]The high price is reduced from 63 to 57 percent to include the effect of the higher energy prices.

[7]These forecasts are close to those of the Canada West Foundation Task Force Report Western Canadian Agriculture to 1990 if similar assumptions for prices are used. The Task Force assumed a 28-percent increase in 10 years under constant real prices (compared with 64 percent in 25 years under similar assumptions for prices in this study).

Historically, summerfallow, generally in excess of 25 million acres each year, has provided much of the reserve for short term expansion. Agronomists estimate that it could be reduced to 10 percent or less in the black and grey wooded soil zones and 20 percent or less in dark brown soil zones. This reduction would increase the area available for cropping by about 12 million acres. As well, it is estimated that of the 436 million acres in the Prairies, about 107 million are suitable for wheat, but only 32 are well-suited. Another 32 million acres could be improved, only 19 of which would be suitable but not well-suited for wheat.

In Eastern Canada, the elasticity of the grain supply response used (total output in response to prices) was 0.14 in the short run and 0.48[8] in the long run. As well, there is about a three percent annual trend increase not associated with these price effects as corn is being substituted for lower-yielding grains such as oats, genetic improvements in barley, increased use of purchased inputs, better management, and capital improvements. Taking into account the higher real prices and continued production trends, grain and oilseed production in Eastern Canada by 2000 is projected to increase by 117 to 131 percent (Table IB).

For all of Canada, it was estimated that total grain production would be 86 percent higher under low prices and 107 percent higher under the high price scenario[9] from 1975-2000. This represents an annual increase of 2.5 to three percent per annum.

b) Livestock: The calculated long-term livestock potentials are more subject to error than calculations of crop potentials. Beef in particular would be subject to strong competition from grains in the use of land for grazing and forage and the production response potential could be greatly reduced by expectations of high interest rates and rising feed prices.

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[8]Calculated from individual grain elasticities. The price elasticities and supply response changes are summarized in Table IA for Western Canada and Table IB for Eastern Canada.

[9]The high price scenario includes the effect of higher energy costs.

Results from the econometric model showed that beef and pork production would increase greatly. Expansion would be faster in the East than in the West, since traditionally, during periods of strong grain markets, prairie farmers have opted to expand cash grain sales and contract livestock production.[10] As well, structural change in Québec hog production has greatly expanded its capacity.

As a result of improved productivity (feed efficiency, genetics, management, capital investment), there has been an upward trend in pork production of about three percent annually[11] which is independent of price. If hog production would continue at this historical rate, after adjusting for the earlier decrease in feed prices, it would increase 90 percent during 1975 - 2000. Taking price into account, the model projected an increase of 88 and 83 percent in the West and 97 to 109 in the East under the low and high commodity prices.[12] For Canada the potential would be an increase of 94 to 102 percent.

For beef production, the upward trend from 1948-72 averaged about 3.5 percent annually. Thirty percent of this increase was due to larger numbers slaughtered, while 70 percent was from increases in carcass weight. Part of this trend, 0.5 percent, can be attributed to an upward trend in beef prices. Also, lower grain prices accounted for an estimated five percent of the total increase in beef production during this period. If these trends continued, there would be an increase of about 104 percent in beef production from 1975 - 2000. Under the price scenarios, the model projected an increase of eight and 24 percent[13] in the West and 16 and 47 percent in the East for a Canadian total of 10 and 29 percent. Therefore, the total beef production potential in Canada was estimated to increase 114 and 133 percent for 1975 - 2000.

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[10] MacAulay, T.G. Chapters 1 and 2 of Commodity Forecasting Models for Canadian Agriculture, Agriculture Canada Technical Publication 78/3, December 1978.

[11] Petrie, T.M. Seasonal, Cyclical and Trend Variations in the Hog Industry and Cattle Industry, Agriculture Canada, 1974.

[12] These estimates are near the low end of the range of the Canada West Foundation Task Force Report.

[13] Ibid.

For the purpose of projecting the supply of dairy and poultry products it was assumed that production would satisfy the domestic market. Canada would be neither a major net exporter nor major net importer of these products. The assumption may be realistic for dairy because of the protectionistic policies of most industrialized countries. For poultry, however, there could be export opportunities for Canada. The feedgrain-livestock export balance is discussed further in the trade section.

c) Other Commodities: Other agricultural commodities are mainly horticultural crops. Three of these were selected as representative commodities. First, apples are the dominant fruit and were also used to represent all tree fruit commodities with their long production lag. Second, potatoes represent an annual crop which is sensitive to the previous period's supply and price conditions. Third, tobacco is a specialized controlled commodity.

A study for Nova Scotia[14] shows a small response to lagged prices (yield elasticity was 0.32). Therefore, apple production increased seven percent under low prices and 18 percent under high prices. While production has increased nearly 40 percent during the past 20 years, most of this increase can be attributed to price rather than productivity.

Tobacco production has not shown much response to price as supply management agencies in both the United States and Canada have restricted supply. As well, consumer demand should decline as a result of continued health campaigns.

Potato production response to price is estimated to have a short-run acreage response of 0.26, and long-run response of 0.4,[15] which give increases of eight percent under low prices and 23 percent under high prices. In addition, continuing annual yield increases of approximately 1.75 percent during the past 30 years would increase production by another 50 percent to a total of 58 to 73 percent between 1975 - 2000.

[14] Marzouk, M.S. "An Econometric Analysis of Supply and Marketing of Apples in Nova Scotia", CJAE, November 1972, p. 33.

[15] Stodola, B. and R. McNeil, Specification of a Potato Model, unpublished.

6. Agriculture Sector Production

Table 2 summarizes production potentials (expressed as percentage increases) for each of the major commodities for low and high price scenarios. For low prices, total agricultural production would increase 79 percent (2.4 percent annual rate) and for high prices, agricultural production would increase 90 percent (2.6 percent annual rate).[16] Beef would increase most rapidly, while grains, dairy, vegetables, and pork would increase substantially.

It should be emphasized that Table 2 is not a forecast. It illustrates the likely impact on output of the selected price range under continuing historical relationships, current policies, and relative prices.

7. Trade Projections

The demand forecasts described in Section 4 illustrate the expected growth in the domestic market for food commodities from 1975 - 2000. Section 5 makes the production projections under the two price scenarios and continuing trends. The change in Canada's surplus for export from 1975 to 2000 was obtained by comparing the respective growth rates for demand and supply for each commodity.

The results, shown in Table 3, are as follows: Under low prices there would be a larger surplus of pork, wheat, and feed grains for export by 2000 and larger net imports of fruits and vegetables. Under high prices, there would be a larger surplus of all commodities except those under supply management.

Measurements of potential trade are unreliable since small errors in either production and/or consumption are magnified in calculating the surplus available for export. Furthermore, the distribution of output, shown in Table 2, is based on assumptions of continuing historical relationships, existing policies, and similar input/output prices. Moreover, agricultural prices are unlikely to increase uniformly as assumed in the two price scenarios. Hence, the distribution of output and net trade could vary considerably from the forecasts in Tables 2 and 3. The

[16] This compares with an annual growth rate of 2.4 percent in the index of farm output for 1961 - 73.

livestock-grains trade-off is of prime concern. The production potentials for grains indicate substantial latent growth potential. Whether this grain would be exported or fed to livestock would depend upon Canada's comparative advantage in meat production, domestic and foreign policies, and producers' expectations. The Crow Rate for grain transportation is an important domestic policy which will influence the nature of agricultural exports. The adoption of compensatory rates would alter the present relationship of grain to livestock prices in the prairies.

TABLE IA. WESTERN GRAIN SUPPLY RESPONSE AND IMPACT OF PRICE INCREASES

| | Elasticity | Percent Increase | | | |
|---|---|---|---|---|---|
| | | Low Price | | High Price | |
| | | % | Mil. Acres | % | Mil. Acres |
| Acreage | .6 | 13 | 6 | 34 | 17 |
| Yield | 0.15 | 3 | | 9 | |
| Yield Trend (2% per year) | | 64 | | 64 | |
| Yield on new land | | - 3 | | - 7 | |
| TOTAL | | 77 | | 100 | |

TABLE 1B. EASTERN GRAIN SUPPLY RESPONSE AND IMPACT OF PRICE INCREASES

| | Elasticity | Percent Increase | |
|---|---|---|---|
| | | Low Price | High Price |
| Production Response | 0.4 | 8 | 22 |
| Trend (3% per year) | | 109 | 109 |
| TOTAL | | 117 | 131 |

TABLE 2. SUMMARY OF COMMODITY PRODUCTION PROJECTIONS FOR THE 1975 - 2000 PERIOD

| Commodity | Weight[a] | Percent Increase | |
|---|---|---|---|
| | | Low Prices | High Prices |
| Grains and Oilseeds | .29 | 86 | 107 |
| Beef | .26 | 114 | 133 |
| Pork | .10 | 94 | 102 |
| Poultry | .05 | 56 | 30 |
| Eggs | .02 | - 5 | 2 |
| Dairy | .14 | 45 | 34 |
| Fruits | .01 | 7 | 18 |
| Vegetables | .02 | 58 | 73 |
| Tobacco | .02 | - | - |
| Other | .07 | 58 | 73 |
| TOTAL | 1.00 wt. ave. | 79 | 90 |
| Annual Average | | 2.4 | 2.6 |

[a]Uses cash receipts for weighting.

TABLE 3. CHANGE IN SURPLUS ABOVE DOMESTIC REQUIREMENTS AVAILABLE FOR EXPORT, 1975-2000, UNDER LOWEST AND HIGHEST POTENTIAL PRICE CHANGES

| Commodity | Lowest Price Change | Highest Price Change |
|---|---|---|
| Beef | no change | greatly increase |
| Pork | greatly increase | greatly increase |
| Poultry | no change | no change |
| Dairy | no change | no change |
| Fruits and Vegetables | decrease | increase |
| Wheat | greatly increase | greatly increase |
| Feedgrains | increase | greatly increase |

## CONSTRAINTS TO GROWTH AND DEVELOPMENT

### Short-term Commodity Price Variability

a) Agricultural commodity markets are characterized by instability of prices in both the short and medium term (see attached charts). Factors contributing to this instability include:

   i) The natural hazards (diseases, pests, unfavourable weather) to which crops and livestock are exposed give rise to uncontrollable variations in supplies. As agricultural production expands onto more marginal land, the risks of these supply variations will increase;

   ii) Production commitments required for many commodities have two effects. First, farmers tend to base their production decisions on current market prices. If prices are good, farmers expand their enterprises, aggregate production increases, and prices fall. These lower prices lead to cutbacks in production causing prices to rise again. This cyclical pattern of prices and production is characteristic of many crop and livestock products, e.g., potatoes, cattle, and hogs. Second, because of the long production period, farmers are unable to make rapid adjustments in production in response to changing market conditions.

   iii) The cost of storing many commodities prevents farmers from holding product off the market when prices are low.

   iv) The inelasticity of the demand for food is such that small changes in production levels are reflected in more than proportionate changes in prices.

b) Because Canada is a major agricultural trading nation, commodity prices in Canada are influenced by conditions around the world, e.g., prices for Canadian grains are affected by crop conditions in the United States, the Union of Soviet Socialist Republics, Eastern Europe, etc. Moreover, given the interdependency of the various components of the food system, instability of commodity prices is quickly transmitted to other parts of agriculture, to the food processing industry, and to consumers.

Market instability acts as an impediment to agricultural growth and development and leads to inefficient use of resources in the food system. When prices (and incomes) are low, farmers are forced to contract and when prices recover, existing operations are expanded and new ones started. This movement of resources in and out increases the cost of producing agricultural commodities. Moreover, during periods of high prices, farmers may make financial commitments that they are unable to meet when prices fall. They may also begin to pay more for capital assets (e.g., land) than is warranted by returns over the longer term. The adoption of new capital-intensive technology may be retarded if farmers are uncertain of return. Market instability may militate against specialization in agricultural production as farmers seek to avoid "putting all their eggs in one basket". It also contributes to excess capacity in the marketing system which is designed to handle peak through-puts.

c) As a response to these problems, the government has put in place a range of policy instruments to deal with the problems of instability in commodity markets. These programs include crop insurance, the provision of market situation and outlook information, financial assistance for the construction of storage facilities, cash advances, protection against unfair competition from imports, the Agricultural Stabilization Act, the Western Grain Stabilization Act, and national commodity marketing agencies.

2. Natural Hazards

Natural hazards are a major dimension of instability and uncertainty in the agri-food sector. Crop and to a lesser extent livestock production is subject to the vagaries of weather in the form of drought, flooding, hail, early or late frosts, and extreme winter temperatures, as well as losses due to insects diseases, and weeds.

The Prairie Region is particularly vulnerable to weather hazards. For example, in wheat production for 1950-76 average, yield has ranged from 710 to 2000 kilograms per hectare, and it has been estimated that 50-60 percent of the variability is due to available soil moisture.

The intensity and total effect of weather hazards on other crops vary considerably and are difficult to document. In

extreme cases they may cause near crop failures (e.g., damage to peaches, apples, and other tree fruits about once or twice a decade), while in other instances they may reduce the crop and cause major fluctuations in market prices (e.g., potatoes). These natural hazards are nearly beyond control but can be alleviated by breeding hardier or earlier-maturing varieties. The steady expansion of the grain corn production area through the development of shorter-season hybrids is an example of this approach.

Estimates of crop losses caused by insects, diseases, and weeds aggregate to approximately one-third of the annual production in Canada. Many insect and plant diseases have built up resistances to pesticides. Some pesticides have damaging effects on non- target organisms and others may accumulate in the food chain as a hazard to human health. The price of pesticides has risen drastically because of their petroleum base.

Livestock producers are likewise subject to the vagaries of weather and pest hazards as they affect grain and forage supplies. Producers also face uncertainties of annual death losses from animal diseases. Death losses per 1000 animals amount to 45, 74, and 128 respectively for cattle, swine, and sheep.

3. Inadequate Levels of R & D in Production and Processing

a) The size and nature of the firms in the agri-food industry require that most R & D be publicly funded:

- Canadian-owned food-processing firms and farms are too small to maintain research facilities;

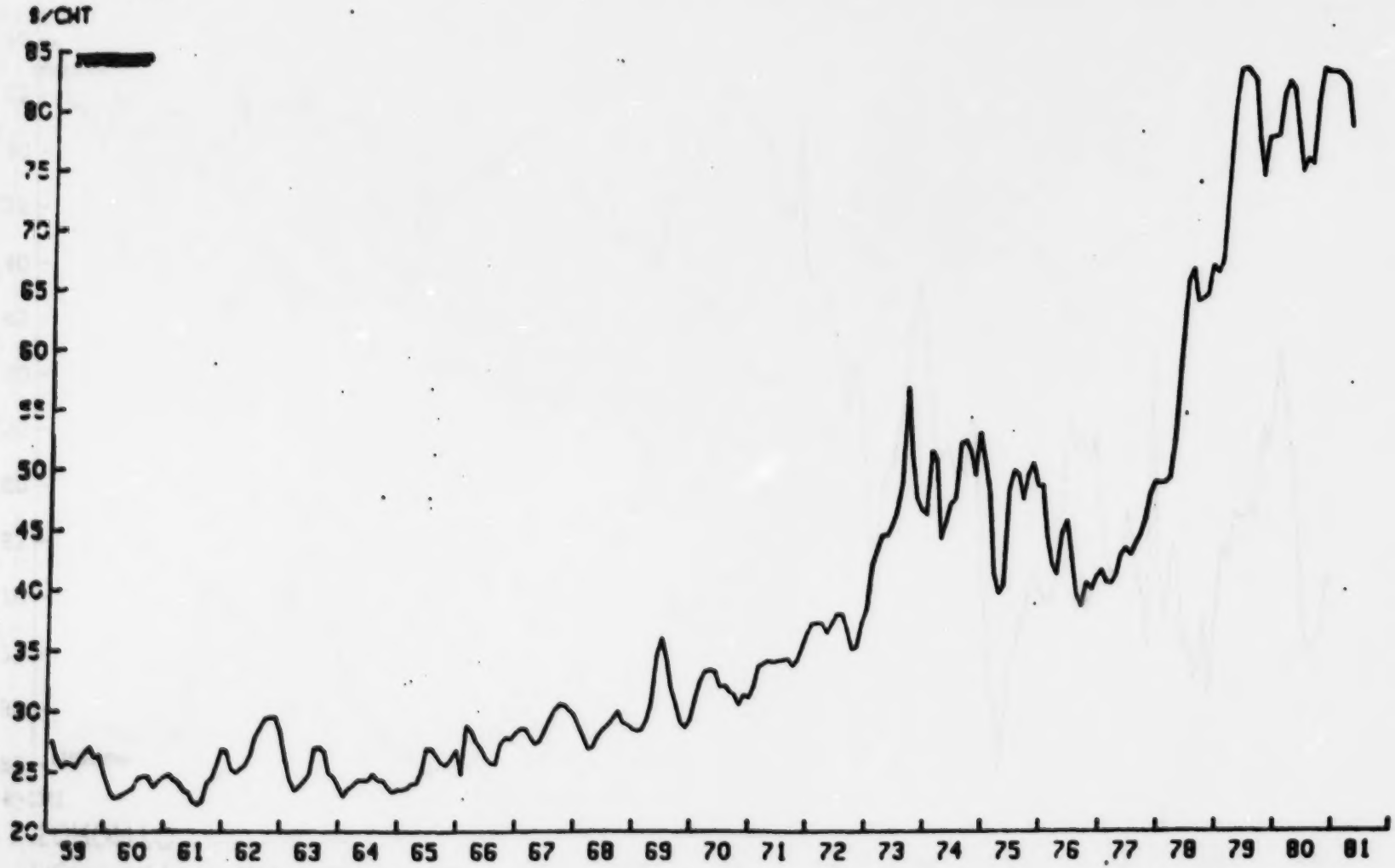
- Multinationals in food processing do their research abroad and this is usually not tuned to Canadian requirements;

- Much R & D is long-term (e.g., breeding) and with significant social benefits external to a private firm.

b) R & D in agriculture and food processing has a creditable record; e.g., the rapeseed industry developed out of the application of genetical engineering to produce rapeseed with modified chemical components; the continuing improvement in yield and quality of hard red spring wheat resistant to the new races of wheat rust.

# CHARTS ILLUSTRATING INSTABILITY IN AGRICULTURAL COMMODITY MARKETS

MONTHLY AVERAGE PRICE OF CHOICE SLAUGHTER STEERS, TORONTO

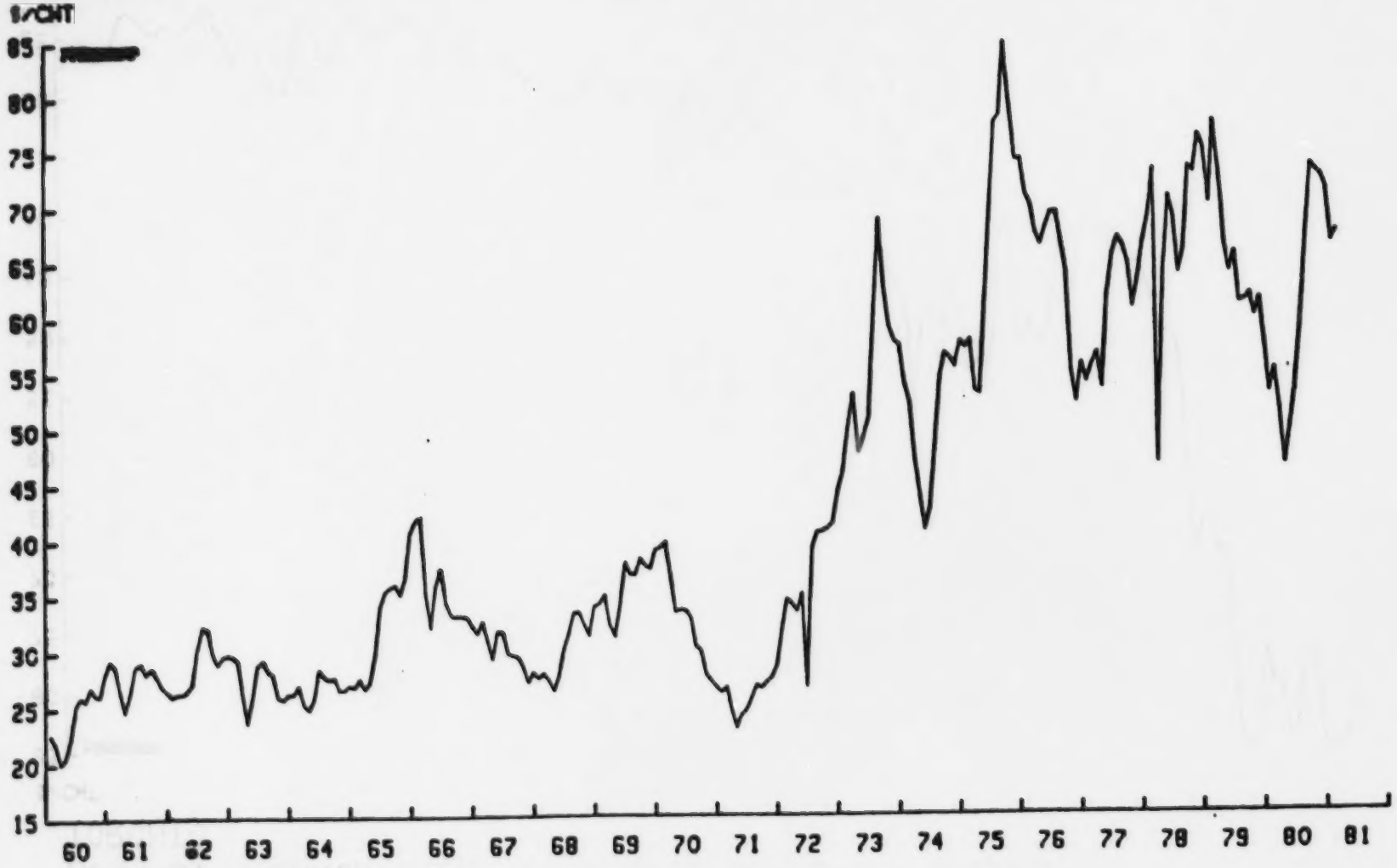



SOURCE: AGRICULTURE CANADA LIVESTOCK MARKET REVIEW



ANNEX

MONTHLY AVERAGE PRICE OF INDEX 100 HOGS, DRESSED, TORONTO

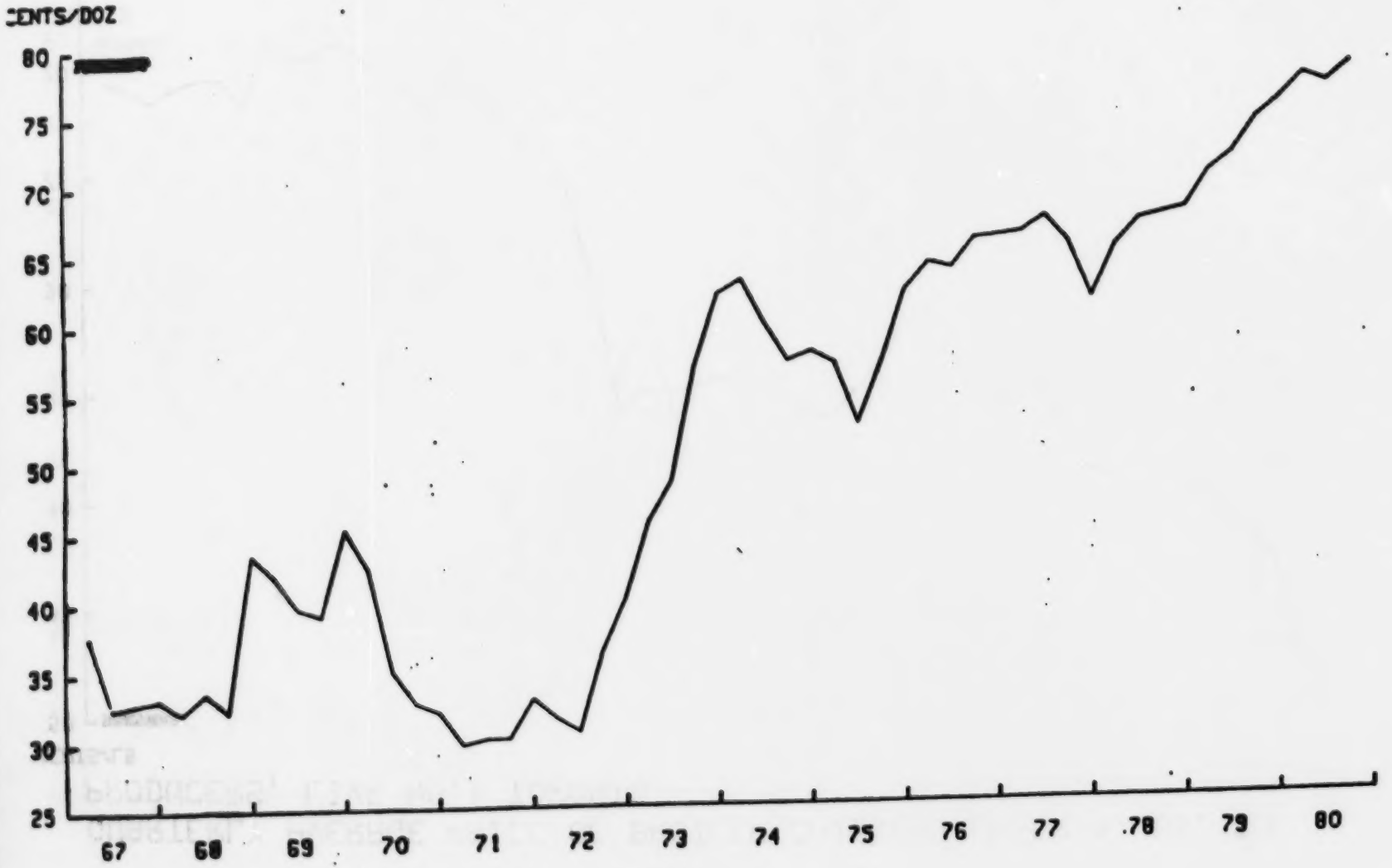



SOURCE: AGRICULTURE CANADA LIVESTOCK AND MEAT TRADE REPORT



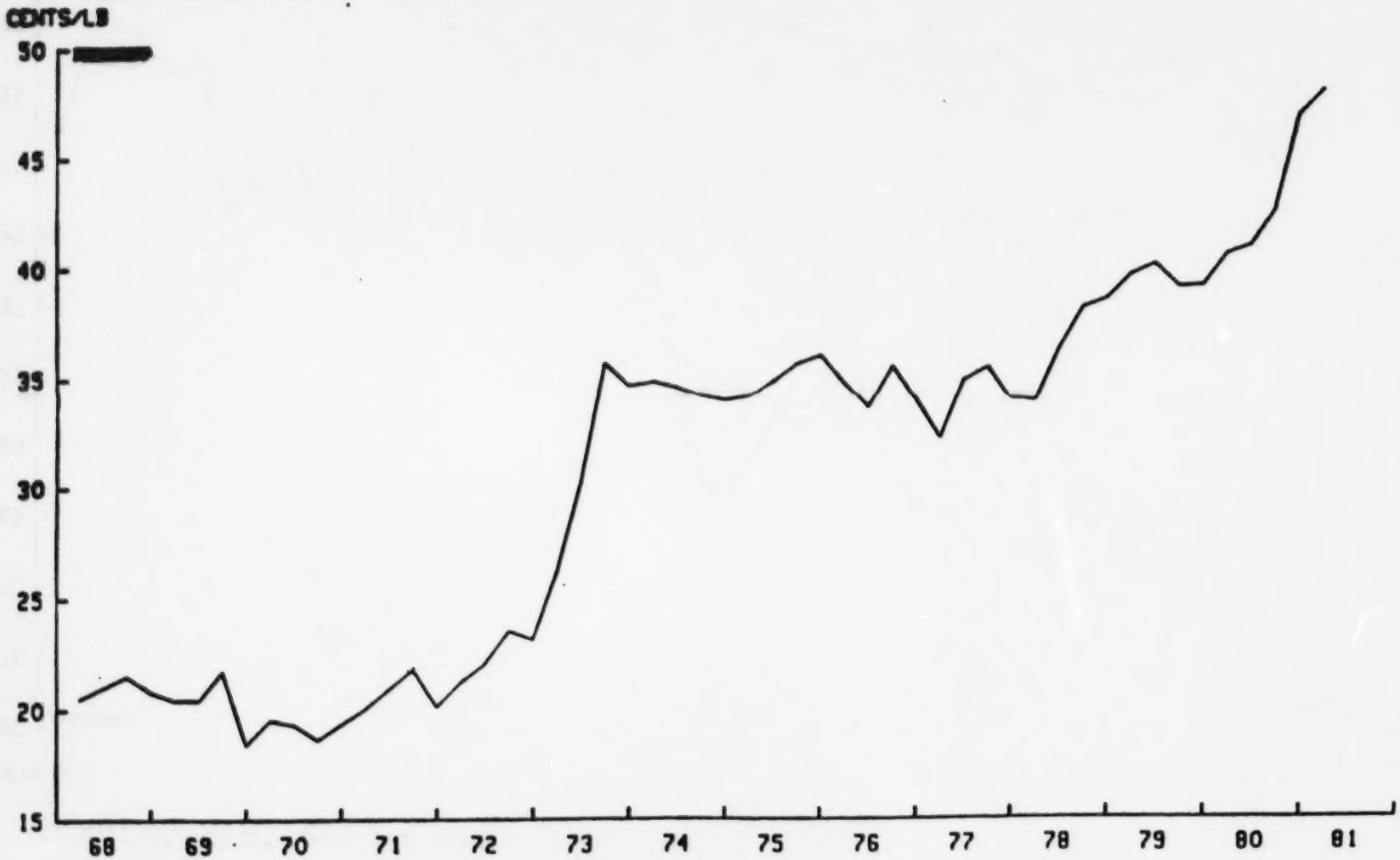
ANNEX

# QUARTERLY WEIGHTED AVERAGE PRICE OF EGGS TO PRODUCERS AT REGISTERED GRADING STATIONS, CANADA




SOURCE: AGRICULTURE CANADA POULTRY MARKET REPORT

# QUARTERLY AVERAGE PRICE OF BROILER CHICKENS UNDER 4 LBS. TO PRODUCERS, LIVE NO.1 TORONTO

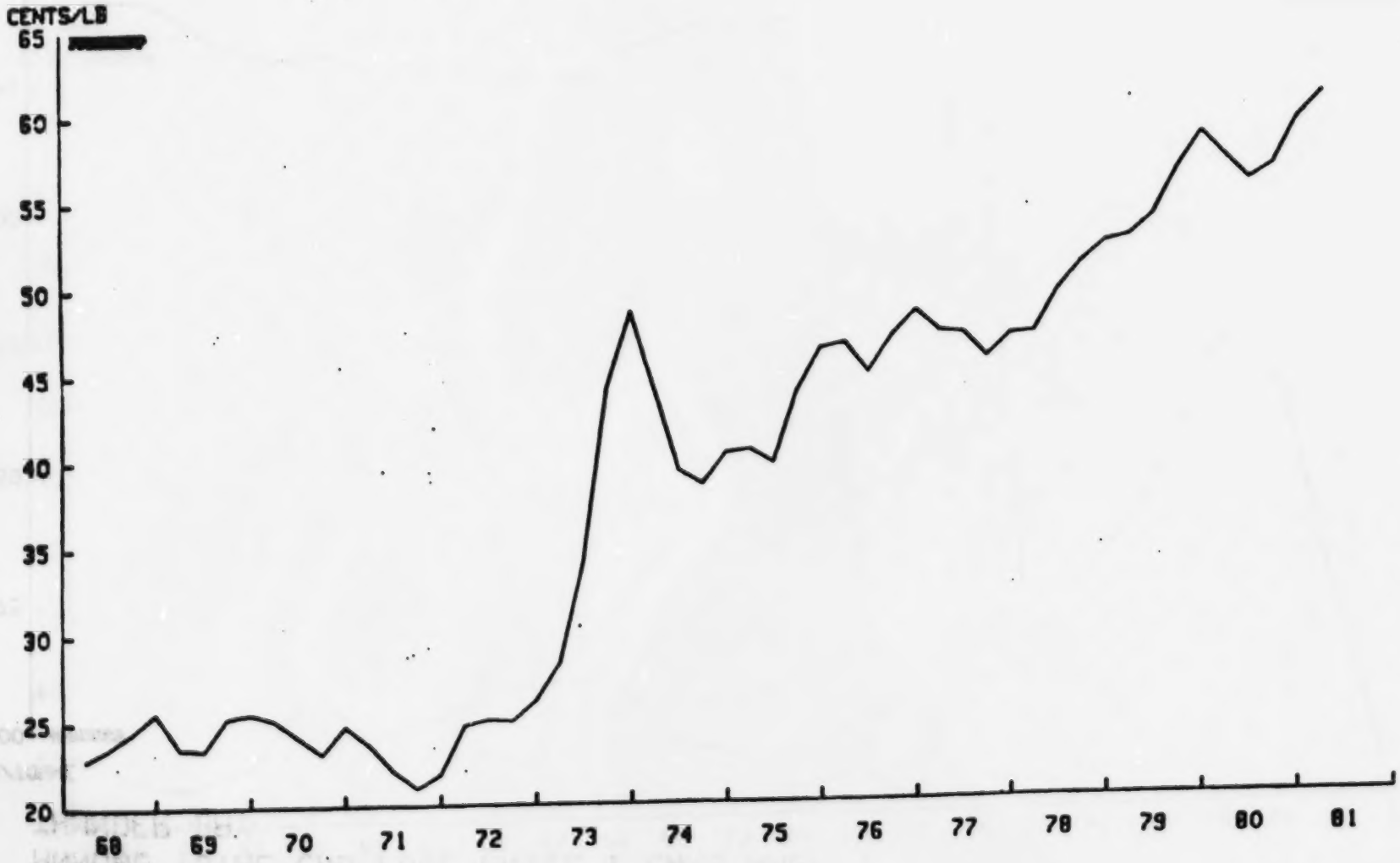



SOURCE: AGRICULTURE CANADA POULTRY MARKET REPORT



ANNEX

QUARTERLY AVERAGE PRICE FOR TOM TURKEYS (12-20 LBS.) TO PRODUCERS, TORONTO

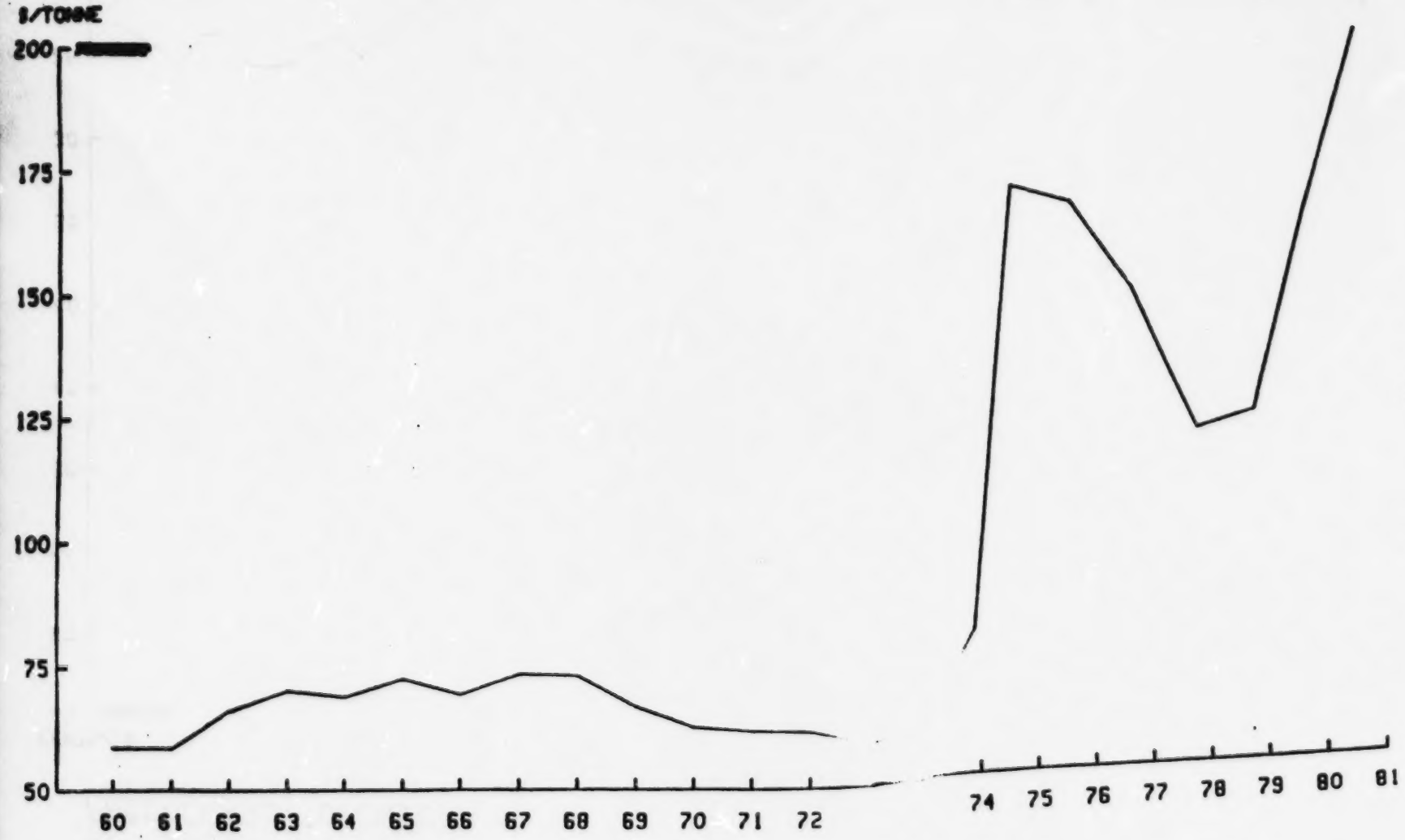



SOURCE: AGRICULTURE CANADA POULTRY MARKET REPORT



ANNEX

ANNUAL TOTAL CWB POOL PRICE 1 CWRS WHEAT,
THUNDER BAY

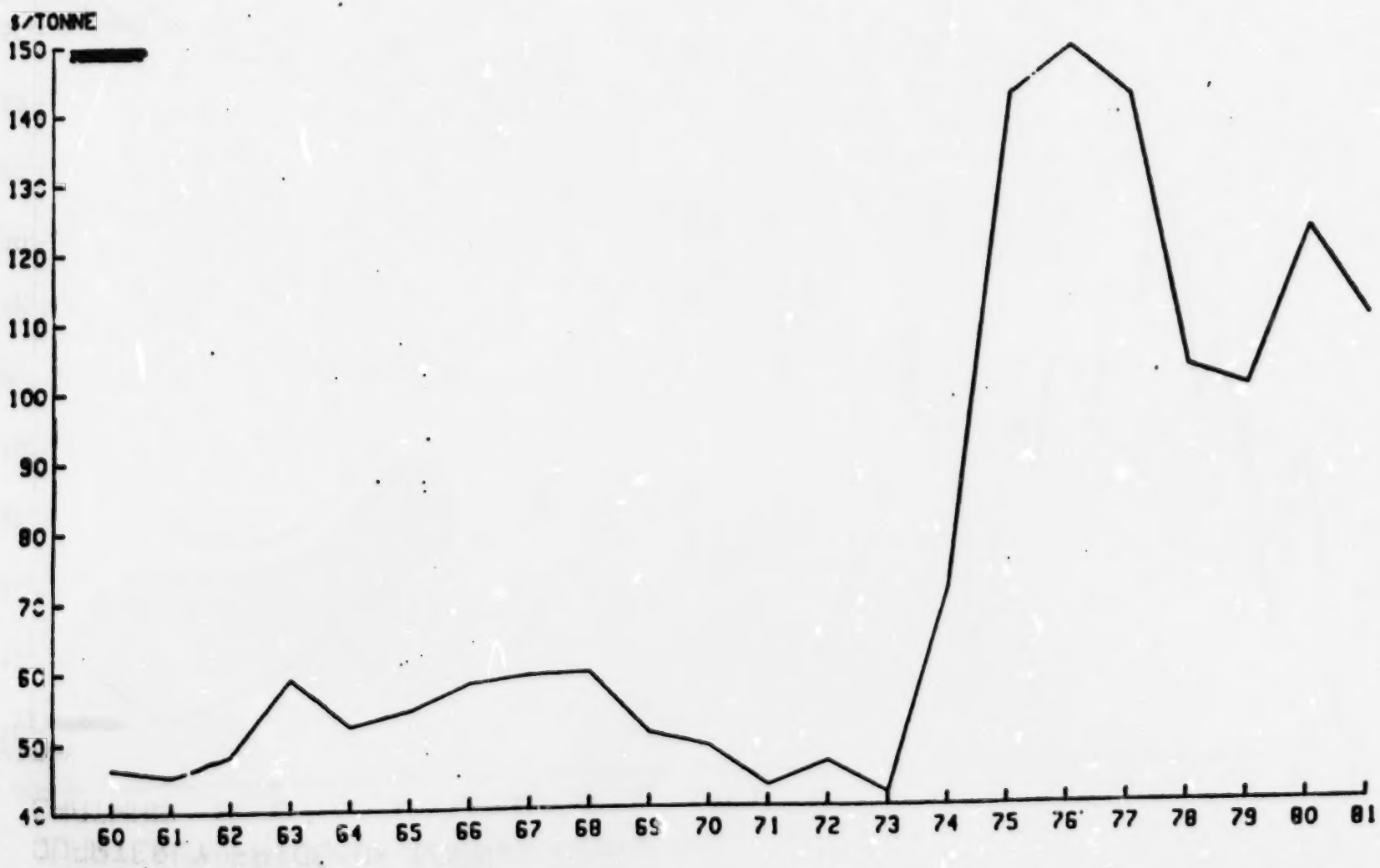



SOURCE: CANADIAN WHEAT BOARD ANNUAL REPORT



ANNEX

ANNUAL TOTAL CWB POOL PRICE 2CW 6R.O.W. BARLEY, THUNDER BAY

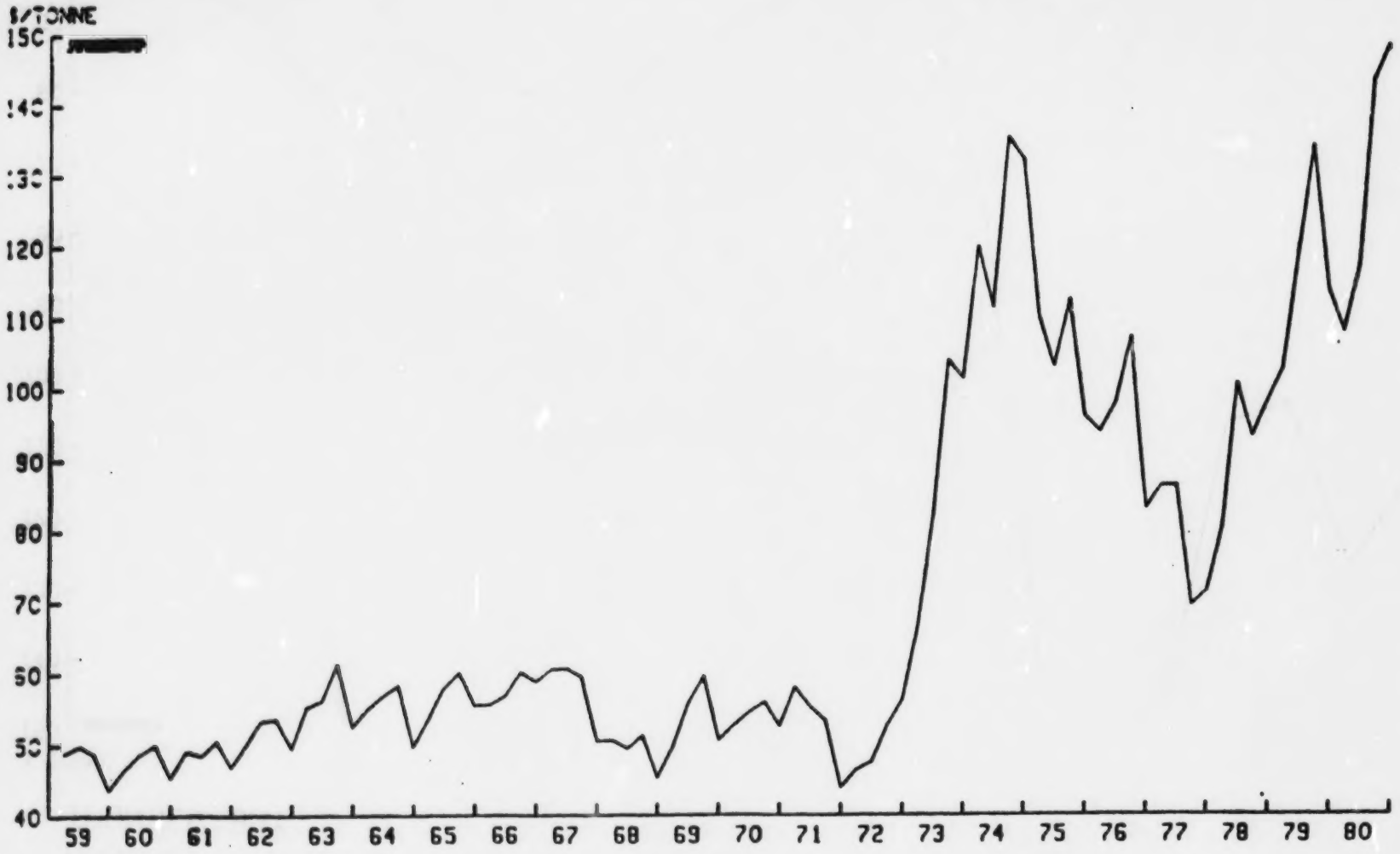



SOURCE: CANADIAN WHEAT BOARD ANNUAL REPORT



ANNEX

# QUARTERLY PRICE OF CORN, CHATHAM

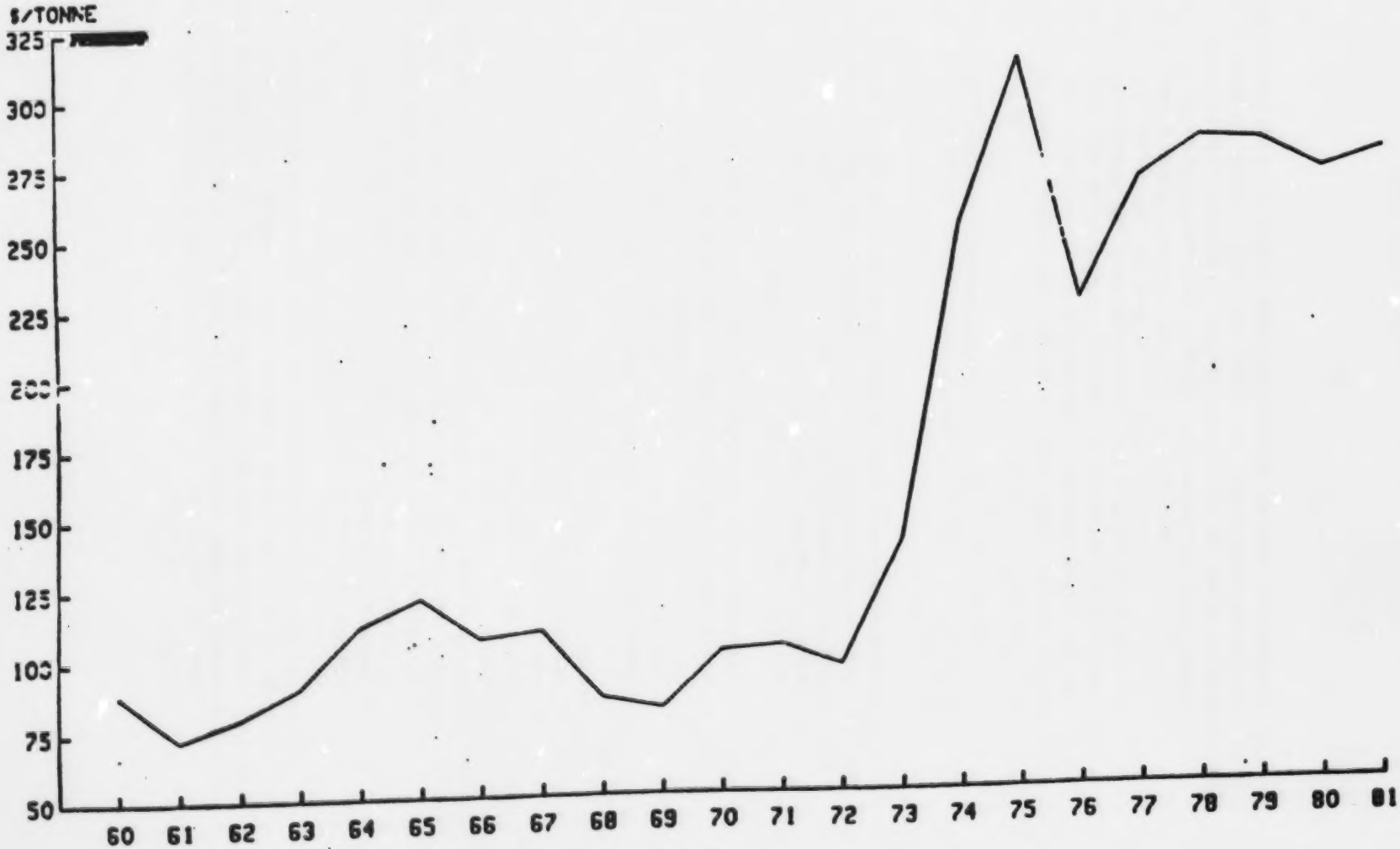



SOURCE: STATISTICS CANADA GRAINS AND OILSEEDS REVIEW



ANNEX

## ANNUAL PRAIRIE FARM RAPESEED PRICE




SOURCE: STATISTICS CANADA GRAINS AND OILSEEDS UNIT

c) Canada has lost or missed the advantages of leadership because of inadequate support of research, e.g., delay in developing winter wheat of sufficient winter hardiness has severely restricted the hectarage of this otherwise superior crop; insufficient research on pest management systems that reduce reliance on chemical pesticides and on the ultimate fate of pesticide chemicals currently prevents the use of many potentially valuable pesticides; competitors are moving fast in the production and sale of new varieties of crops (Granny Smith apple), improved livestock (year-round breeding sheep), and changes in production technology (zero-tillage).

d) To support agri-food as a growth sector, present R & D funding is inadequate to advance adequately technical knowledge on:

- stress on crops from drought and low temperatures (50 to 60 percent of the year-to-year variation in prairie crop yields is due to the availability of soil moisture; winter cold or spring frosts cause tender fruit crop failures or serious reductions about twice a decade);

- soil salinity, now affecting close to 10 percent of prairie soils and increasing at an alarming rate;

- loss of organic matter in agricultural soils with resulting lower fertility and water-holding capacity;

- nitrogen fixation by natural processes to avoid the dependence on petroleum-based chemical fertilizers (one-third of the existing nitrogen in prairie soils has been used up in crop and animal production);

- about 25 percent of the crop land in the Prairie Region is under summerfallow. This practise results in soil nutrient losses. Research in technical and economic management in moisture control and zero tillage to reduce this summerfallow area to 10 percent would have a high payoff in output and conservation;

- cytogenetical techniques for strain development (new breakthroughs of science at the cell-gene level await exploitation and agricultural application. Increased basic research now, ahead of world competitors who are devoting massive resources in this area, is essential if Canada is to stay in the race;

- energy efficiency, particularly in food processing (a conservative figure of the potential energy savings is 25-50 percent; a recent blancher system developed by the Research Branch demonstrated a 90-percent reduction in energy requirements);

- increased replacement of imported fruits and vegetables by Canadian alternatives (imports amount to about 23 percent of the consumption of fruits and vegetables that can be produced in Canada). Their dollar value for 1979 was $370.2 million;

- to develop the production potential of unused land with agricultural production potential in Canada amounting to 60 million hectares, largely in the North;

- new techniques in food processing - the whole area of enzymology and fermentation is largely unexploited, and the separation of commodities into components that can be used as ingredients in processed products is still in the early stages of development;

- conservation and use of agricultural waste products, estimated at over 200 million tonnes or over 40 pounds of waste annually for every dollar of final product value.

e) During the last decade federal research expenditures in agriculture and food have not increased in proportion to the growth of GNP in contrast to major competitors (such as the United States and Japan) where proportions are two to three times greater.

f) Research will require additional scientists and technicians as restrictions on research during recent years have resulted in a scarcity of trained personnel. The Natural Sciences and Engineering Research Council has taken steps to encourage graduate training for scientists, including providing Research Associateships to employ scientists before industry and other agencies can absorb them. Within agriculture, a small University Operating Grant program, designed to encourage graduate training in agricultural science, is of some help. Others are assisted by the educational leave program of Agriculture Canada. Even so, in the short term it may be necessary to recruit individuals who are not trained to the full degree desired.

4. Environmental Damage

a) There is a significant deterioration in the quality of agricultural land in Canada due to erosion and environmental pollution. Row crops are particularly subject to water erosion. Annual losses from sheet and rill erosion amount to 13,000 acres in Ontario alone.[17] With large fields, few barriers and the abandonment of strip cropping, Western Canada has been particularly suceptible to wind erosion in times of drought.

b) Eastern Canadian agriculture has also been affected by industrial pollution. Between 1955 and 1975, atmospheric ozone from Detroit is estimated to have caused $25-million worth of damage to Ontario tobacco production.[18] In areas in proximity to urban centres, there is increasing land and water pollution from waste deposits.

c) Soil salinity is a pervasive problem in the Prairie Region, seriously affecting about 10 percent of the cultivated area, and increasing steadily. The widespread practice of summer-fallowing (about 25 percent of cultivated area) affects water movement in the soil and appears to be a major cause of the problem. Increases in yields over the years have resulted mainly from applied fertilizers, while the native productivity of the soil has decreased about one-third. The present increase in soil salinity must be arrested to prevent any reduction in crop production potential.

d) Present agricultural production methods depend heavily on the effective use of pesticides to control diseases, insects, and weeds. These materials often pose threats to the environment. The most effective means of control appears to be an integration of chemical and non-chemical methods, building up the influence of biological and other control agents, while at the same time using pesticides discriminately. This reduces the volume used and their side effects on the environment are alleviated. Such procedures require more detailed knowledge

[17] The Agrologist: Fall 1980.

[18] Remarks by E. Biggs, Ministry of the Environment to the 16th Annual Meeting of the Ontario Institute of Agrologists, April 1975.

of the interaction of the pest with natural factors of the environment and of the breakdown products of the chemicals and their ultimate fate in agricultural products or the environment.

e) Intensification of agricultural production has been feasible because the use of modern herbicides, fertilizers, and cultural methods has made it possible to practise monoculture and continuous production without reducing yield or impairing crop quality. However, sometimes there are undesirable side-effects on the environment from the persistence of chemical residues or deterioration of the soil, as for example from large areas in summerfallow.

f) There are a number of environmentally stressing production practises:

- Agricultural wastes of animal origin are not always re-cycled back to the land;

- Heavier machinery is damaging the soil through compaction;

- Summerfallow causes a breakdown of soil organic matter and a severe decrease in nitrogen and in the micronutrient supplying capacity of the soil (Rennie);

- Cleared areas in the landscape (natural barriers) increase the threat from erosion (Coupland);

- Increasing grain production reduces the land area devoted to hay and forage, and thereby the benefits to the soil of forage rotations. Freight rates also restrict livestock industries and coarse grain production (C.M. Williams).

g) Acid rain is a potential threat to agriculture, although its effect on production is not known. The consequences could be very serious.

5. Rising (Real) Petroleum-Based Input Costs

a) Energy and energy-related farm inputs (fertilizers and pesticides) account for a significant proportion (25 percent in 1980 compared with 19 percent in 1973) of the operating

expenses of Canadian farmers. Hence, real increases in the prices of these inputs increase total farm costs sharply and induce a search for alternatives. Higher prices for energy and energy-related inputs account only partly for the rising share; increased use of fertilizers and pesticides is also a factor. Table 1 shows the share that these inputs are of farm operating expenses in Canada.

b) Canadian agriculture is heavily dependent on liquid fossil fuels. While primary agriculture consumes only about three percent of the total energy consumed in Canada, more than three-quarters of the energy is liquid petroleum fuel. Agriculture uses seven percent of the gasoline and 11 percent of the diesel fuel. Despite rising energy prices, the investment in farm equipment by Canadian farmers continues to rise; from $4.2 billion in 1973 to $6.45 billion in 1979 (data for both years in 1971 dollars). But the share that machinery constitutes of total farm capital has remained at 15 percent in both years. The principal implications of rising energy prices for machinery investment on farms lie, therefore, in the type and size of machinery. The trend is toward the use of large, diesel-powered tractors and large-capacity equipment which can reduce energy use per unit of land and per unit of output. At the same time, the use of propane and natural-gas-powered equipment is increasing in farming, as elsewhere, and should increase further with increased availability of these fuels and the necessary distribution facilities.

c) Crop production in Canada is highly dependent on the use of fertilizers and pesticides to maintain and increase output from a relatively fixed land base. Consumption of the three primary nutrients (N, $P_2O_5$, $K_2O$) has risen from just over one million tonnes of nutrients in 1973 to 1.46 million tonnes in 1980. Expenditures on fertilizers have increased from 5.6 percent to 10.2 percent of total farm operating expenses in the same period. Consumption of pesticides is also up. In terms of constant 1971 dollars, pesticide use on Canadian farms rose almost 50 percent between 1973 and 1980, increasing from 2.2 percent of farm operating expenses in 1973 to 3.7 percent in 1980. With higher real prices for these inputs due to the embodied energy component, crop production costs will rise unless efficiency in use can be improved. Alternatives to the use of these fossil-energy-

based inputs lie, for example, in changes in husbandry practices, biological control of pests as alternatives to chemicals, and in the development of a greater range of crops capable of biological nitrogen fixation such as the legumes.

d) The "food-for-fuel" issue, when viewed in the perspective of the recent past, is not different in principle than using farm products to feed work animals, as was the case before the wide-spread introduction of fossil-fueled machinery. But fuel produced on farms will have to meet the test of whether it can compete economically with alternative off-farm sources such as electricity, methanol from coal or wood, and natural gas.

e) Extensive on-farm production of alcohol fuel from biomass sources could divert food and feed grains from the market, possibly resulting in higher prices for these commodities. At the present time, however, production of fuel alcohol from grains cannot compete with fossil fuels in Canada. Furthermore, in capital-intensive agriculture, the costs of producing fuel alcohol from farm-produced biomass tend to rise at least as rapidly as inflation because of embodied energy costs. The most common sources of farm biomass, items such as crop and animal residues, are limited in supply and have alternative economic value in maintaining soil structure and humus content necessary for crop production. It has been estimated that to replace 10 percent of the current Saskatchewan motor gasoline usage with alcohol using grain as the substrate would require 4 percent of current provincial grain production. The principal justification for conversion of food crops to fuel alcohol under the conditions outlined could be an over-riding need for security of fuel supply. Other than in this situation, economic opportunities for widespread use of farm products as sources of fuel alcohol competitive with other fuels remain moot.

f) Food processing and packaging account for about one-third of the total energy use in the food system. (The "food system" comprises, in addition to the above, farm production, transportation and distribution, and home preparation). The food system accounts for about 15 percent of total energy use in the economy. Total energy use in the sector has increased from 102 to 106 petajoules 1973 to 1978. But greater opportunities exist in food processing than in primary production for fuel

switching as prices of refined petroleum products rise. From 1973 to 1978 in Canada, the use of refined petroleum products decreased from 45 to 36 percent of total energy used in the food processing sector. Natural gas has been the principal replacement fuel, rising from 43 to 50 percent of total energy used. Some regions of Canada remain heavily dependent on petroleum fuels, but with increased availability the trend to greater use of natural gas in the food processing sector should continue upward.

g) Higher energy costs will increase transportation costs, which are dependent on fossil fuels. In 1973, the transportation sector accounted for 25 percent of total energy use in Canada. By 1979, the proportion had risen to 30 percent. The impact of higher transportation costs falls unequally on commodities. Transportation costs represent about 30 percent of the final price of fertilizers but much less than this for farm machinery. Rising transportation costs, relative to other costs, could improve the competitive advantage of certain locally produced farm products. As an example, the production of sugar from beets in the Prairies is economical only because of the high transportation cost of bringing raw cane sugar from off-shore by rail. As costs of petroleum rise, relatively more transportation facilities will likely be powered by electricity or coal.

h) Canada has become increasingly dependent on off-shore oil supplies in recent years. Canada imported 90 percent of its requirements in 1947, was nearly self-sufficient in 1968, and was a significant net importer of crude oil by 1975. Disruptions in the world crude oil supply could not only affect prices and supplies of fuels used by Canadian agriculture but also supplies of petroleum-based inputs which are manufactured abroad, especially pesticides. Such disruptions in off-shore oil supplies could mean cutbacks in the production and processing of farm products in Canada or the use of higher-cost, short-run alternatives to maintain output. In the short-run, however, basic food production can be maintained through the allocation of fuel supplies at the expense of less critical uses such as personal automobile travel. In the longer-run, reduced dependency on off-shore oil supplies, through conservation efforts and the use of more plentiful fuels in place of oil (including changes in feedstocks for petroleum-based fuels), can improve Canada's energy security and are set out as goals of the National Energy Program.

TABLE 1. Fossil Fuel and Energy-Related Inputs as a Percentage of Total Farm Operating Expenses, Canada, 1971-1980

| Year | Petroleum Products | Fertilizer | Pesticides | Electricity | Heating Fuel | Total Energy |
|---|---|---|---|---|---|---|
| 1971 | 9.3 | 5.6 | 1.6 | 2.3 | 1.5 | 20.3 |
| 1972 | 8.7 | 5.4 | 1.8 | 2.3 | 1.5 | 19.7 |
| 1973 | 7.7 | 5.6 | 2.2 | 2.1 | 1.5 | 19.1 |
| 1974 | 7.3 | 6.6 | 2.6 | 1.9 | 1.5 | 20.0 |
| 1975 | 7.1 | 9.0 | 3.1 | 2.0 | 1.6 | 22.8 |
| 1976 | 7.5 | 8.2 | 3.2 | 2.1 | 1.7 | 22.7 |
| 1977 | 7.9 | 8.1 | 3.4 | 2.5 | 1.7 | 23.6 |
| 1978 | 7.3 | 9.0 | 3.6 | 2.5 | 1.5 | 23.9 |
| 1979 | 7.0 | 9.2 | 4.0 | 2.3 | 1.5 | 24.0 |
| 1980 | 6.9 | 10.2 | 3.7 | 2.2 | 1.6 | 24.6 |

Source: Statistics Canada, Farm Net Income, Cat. No. 21-202; and unpublished data.

6. Market Competition

a) International Trade Barriers

World trade in temperate agricultural products is characterized by intense competition. On the supply side, the traditional temperate food exporters (the USA, Canada, Australia, and New Zealand) are faced with growing competition from subsidized EEC supplies as well as the expanding export production of some of the more advanced developing countries, such as Brazil and Argentina. On the demand side, agricultural exporters tend to be residual suppliers to the extent that access to markets in the developed market economies is often limited by a variety of trade policy non-tariff barriers such as variable import levies and quotas, as well as a range of technical trade barriers, such as health and sanitary regulations and packaging and labelling requirements.

Although important areas of international agricultural trade are still relatively unrestricted (e.g., oilseeds, fruits and

vegetables, and the more highly processed food products) and agricultural trade between certain countries is relatively unimpeded by non-tariff barriers (e.g., Canada/USA trade), the fact remains that for many commodity sectors non-tariff barriers tend to be the rule rather than the exception. This is particularly true in the case of the grains, dairy products, and beef import regimes of the developed market economies.

Non-tariff barriers and export subsidies are an inevitable consequence of domestic agricultural income supports which have been set at excessively high levels in relation to world prices. Once production is effectively insulated from import competition, domestic output is stimulated, often resulting in surpluses which can only be disposed of by export subsidies. (This is particularly true in the case of the EEC, which has shifted from a net importer to a net exporter of wheat, barley, sugar, and beef).

The action by a major importer to restrict imports and/or subsidize exports has a "ripple" effect on the entire international market as other importers move to protect their producers from the resulting "unfair" competition.

Because the root cause of the non-tariff distortions lies in the respective domestic agricultural policies, which in turn are a function of domestic socio-political imperatives, it has so far proved virtually impossible to negotiate significant reductions in the non-tariff measures of the developed economies.

Given the access limitations for certain products in the developed economies, agricultural exporters have increasingly turned their attention to developing and servicing the more rapid import growth demand of the centrally planned economies and the more advanced developing countries. In order to reduce the uncertainty inherent in being a residual supplier, many exporters have negotiated long-term supply contracts with both the centrally planned and developing countries.

There is a risk, however, that as bilateral contracts proliferate, this will cause the residual "free" market to shrink and hence to become more volatile.

b) Market Promotion (provincial initiatives)

Several provinces promote the exports of agricultural commodities. In some instances, provincial government organizations carry out export marketing functions normally within the responsibility of the producer or selling organization (e.g., on-market representation, buyer contact, etc.). While in the main these organizations have performed well in developing and exploiting export opportunities for their respective provincial commodities, a competitive element has developed among provinces which may be detrimental to overall trade development for Canada. For the benefit of Canada, federal and provincial promotional activities must be co-ordinated.

Examples of this problem include sales of Canadian pork to Japan during the early 1970s, when provinces followed each other in close succession to the Japanese buyers'offices, and currently sales of cattle and swine livestock and genetic materials to Mexico, as well as of large-scale dryland/ rangeland projects in China.

c) Marketing Mandate of Foreign-Owned Subsidiaries

The export performance of foreign-owned firms in the food and beverage sector is important since the continued growth and development of the Canadian agri-food sector is dependent on export growth for both raw and processed foodstuffs and since foreign-owned firms account for a large and significant share of production in many of the food and beverage processing industries. In 1976, foreign-owned plants accounted for 34 percent of industry shipments in the food and beverage processing sector as a whole, while the share of foreign-owned plants was larger than 60 percent in fruit and vegetable canning and preserving, flour and breakfast cereal products, confectionery manufacturing, and miscellaneous food processing.

Foreign-owned firms, because of both their relatively larger size than domestic firms and the marketing networks and abilities of their parent firms, might be expected to export as much or more than domestically owned firms. On the other hand, there is a concern that in some cases foreign-owned firms might not compete directly against their parent firms in third markets.

Economic studies of this issue have not identified a significant relationship between foreign ownership and poor export performance relative to domestic firms.[19] The results have been inconclusive or show relatively better export performance by industries with a high degree of foreign ownership. These studies, however, generally fail to provide direct evidence of the performance of individual firms. It is well known that the management philosophy of multinational firms can vary significantly in the degree of independence and autonomy granted to wholly owned subsidiaries. Further, measured performance in export markets may not indicate the export potential of foreign-owned firms.

The food processing sector in most developed economies is relatively self-contained, with the bulk of production destined for domestic markets. Despite this, the Canadian food processing sector has a higher export propensity than its counterpart in the U.S., similar to the pattern for all manufacturing. The marketing strengths of multinational food firms should be drawn on where market opportunities exist for Canadian processed food products. Both domestic and foreign-owned firms should be encouraged to seek additional export opportunities in North America and elsewhere.

7. Regional Self-Sufficiency

In much the same way that Canada as a whole strives to optimize its opportunities in both the domestic and export agri-food marketplace, most provinces are involved in programs and policies of direct assistance to producers and processors to help their particular province maximize the benefits to be gained from the greatest share possible of provincial, Canadian, and export markets. Such assistance, when directed to those commodity groups and markets for which the particular province has the greatest relative comparative advantage, vis-a-vis its Canadian counterparts, is generally accepted as economically rational in

[19] B.W. Wilkinson, Canada's International Trade: An Analysis of Recent Trends and Patterns, 1968; A.E. Safarian, The Performance of Foreign-Owned Firms in Canada, 1969; McFetridge and Weatherley; Notes on the Economies of Large Firm Size, 1977; and Caves et. al., Competition in an Economy; A Model Applied to Canada, 1980.

terms of overall efficiency. However, when assistance results primarily in an unfair advantage to producers of one province over another by way of public funds, then a balkanization or an unequitable regional distribution of the industry occurs. Some provinces, either through the priority which they place on the agri-food industry or because of the availability of much larger financial resources, can provide producers and processors in their provinces with an inequitable competitive advantage in those markets which are more properly and efficiently served by their domestic counterparts.

As an example, most provinces provide unilateral assistance to their sector through such programs as stabilization and credit assistance, as well as direct assistance under the federal/ provincial subsidiary agreements respecting the agri-food industry. While most provinces provide assistance of one form or another to hog producers, some provinces add their payments to those provided by the federal government, resulting in a stacking of assistance giving some producers an unfair advantage over their domestic competitors. Further variances in the amount of assistance provided from province to province afford some producers a significant advantage vis-a-vis their counterparts in other provinces. The same situation occurs to varying degrees in other commodity sectors for which direct assistance is provided in Ontario, Québec, Manitoba, and British Columbia. In much the same manner, all provinces provide some form of credit assistance to the agricultural sector, with varying lending criteria and maximum amounts of assistance available, again providing some producers with significant advantages over their domestic competitors.

The same situation can sometimes arise through the use of federal assistance programs which are provided to agri-food producers and processors. Often assistance is made available based upon different criteria and to varying maximums which can result in a producer of one province or locality being in a more "competitive" position than a producer of the same commodity in another area, based solely upon the use of public funds and for which the producer has no natural advantage.

While regional and provincial concerns must be taken into consideration in the national development of the agri-food industry, it is imperative that this development should be based upon improving the viability of those sectors of the agri-food industry in which the province or region has an existing or

potential comparative economic advantage. This will often mean a selective approach to the assistance provided to the industry, either in terms of the geographic regions in which assistance is made available and/or the commodities or products for which assistance is provided. Furthermore, all assistance should be predicated upon sound market identification and development studies to ensure that the impact of such incremental production both on the assisted producers and on other domestic producers is well understood.

While strong provincial and regional pressures will always exist to develop the maximum share of provincial, domestic, and export market potential, the problem of balkanization or inequitable distribution of the industry across the regions has to be minimized if the industry is to develop on an efficient, long-term, viable basis. Not only will this require a strong, co-ordinated federal input, but it will require working in concert with the provinces if realistic market potentials, both domestic and export, are to be linked with the production capability or potential best suited to serve them. By developing the industry based upon sound provincial and regional opportunities within a national framework, the federal government can provide significant direction for the development of the industry in a co-ordinated and efficient manner, ensuring an equitable regional distribution of the commercial and economic benefits which a sound, viable agri-food industry has to offer.

8. Natural Resource Base

a) Total land area being farmed in Canada amounts to 69 million hectares, about 80 percent in Western Canada. Additional land area with some capability for agriculture amounts to about 60 million hectares, but less than five million of these have any significant potential.

b) The constraints to bringing more land into production are that most of the land in the more favourable climatic areas has already been developed and is in use. Extension of the production base will mean the development of lands in the northern parts of the four western provinces, the Northwest Territories, and in the northern claybelt regions of Ontario and Québec.

c) Major problems with the existing land base include:

- Inadequate and improper soil and water management has resulted in increased salinization affecting nearly 10 percent of the cultivated land on the Prairies;

- The loss of up to 50 percent of the organic matter in many of the prairie soils, reducing productivity and making them more susceptible to wind erosion, particularly in a drought situation;

- In the British Columbia interior, Southern Ontario and on the Prairies, water is frequently a limiting factor and less than two percent of the crop area is irrigated; large areas in Western Canada will be short of water by the year 2000, and diversification of the economy could bring water shortages to many areas within the decade; 850,000 additional acres will be irrigated and there will be need for water storage, pipelines, wells, dugouts, and stock dams, all of which will be in competition with industrial needs. Three stages of development are: full utilization of water in many river basins for all purposes, water conservation measures, and water importation from northern areas;

- In much of Eastern Canada drainage is inadequate and is installed in less than 20 percent of the land where it is required;

- Organic soils deteriorate when cultivated due to oxidation. Improved management may slow the process, but the life span of these unique production areas may be less than 50 years;

- Loss of prime agricultural land to urban use is serious, and further losses are imminent as about 60 percent of good agricultural land is within 60 kilometres of larger cities.

9. Structure of Business Units

a) Primary Sector: Many farms are not of the size nor of the technical sophistication to achieve the optimal return to physical resources. They may, however, be yielding acceptable returns to the producers operating them. In many cases, a

farm may be under-capitalized because of the producer's preference. Part-time farmers and those soon to retire generally may not be willing to leverage their operations to the same extent as the more technically advanced producer. As a consequence, they will not realize the advantages of economies of scale which may accrue to the more aggressive producer.

Agriculture tends to adapt to changing conditions through the transfer of land ownership. Those firms which enjoy the better operational structure and technical efficiency should be those most capable of bidding the highest price for land. About six percent of all farms were transferred in this manner over the last few decades. This facilitated substantial changes in the industry.

From 1961 to 1976, total assets per farm increased from $33,000 to $183,000.[20] The land tenure system has changed dramatically. In 1951, 14.3 percent of all farms were partially rented and 28 percent had mortgaged land; by 1971, 26.2 percent were partially rented and 43 percent had mortgaged land. The result was a change to enterprises which are more highly leveraged so as to meet the technical requirements of size and efficiency.

A number of farms fail to achieve the optimal level of efficiency. It appears, however, that there is sufficient transference of farm ownership to facilitate long-term adjustments.

It is difficult to demonstrate variations in management expertise, as there are few standard measures. Variations in crop yield and livestock production may indicate different management practices, but may also be attributable to different soil types, animal breeds, or more intensive use of inputs. Variations in net farm income may demonstrate differing degrees of managerial efficiency, but may also be due to different sizes of farms. One study of limited resource farms[21] which analyzed the differences in production practices and financial management demonstrated that there is indeed significant variation in practices attributable to differences in management expertise.

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[20] Census of Agriculture, Statistics Canada.

[21] G. Brinkham, H. Driver and D. Blackburn, "A Classification of Limited Resource Farmers Based on Behavioural and Economic Characteristics", University of Guelph, 1977.

It may be possible to gauge management expertise also by the amount of formal education of the operator or by the relative amount of machinery and equipment he employs. There is considerable variation among producers for both those characteristics.

In 1971, 58 percent of all farm operators had only some primary school, 38 percent had some secondary education, and four percent had studied at university.[22] In the Ontario dairy industry, the average value of machinery and equipment varied from $16,215 in the low technology category to $72,815 in the higher category.[23] Similar observations are possible in other commodities. It would appear that a number of producers could improve their production practices through the upgrading of their management.

b) Secondary Sector: If Canada is to take advantage of the growth in food demand, the food processing industry will need to be able to compete on world markets. This requires the ability to provide stable supplies of quality processed products at internationally competitive prices. The question is what constraints the Canadian processing sector might face in meeting this challenge. This section provides information on the structure of this sector, recent changes in several performance measures, and a brief discussion of constraints.

i) Industry Structure -The food and beverage processing industry is Canada's largest manufacturing industry. In 1978, 4,535 plants had shipments of $22 billion, which was 17.0 percent of total manufacturing shipments. The industry employed 229,906 people, or 12.8 percent of total manufacturing employment.

Within the food and beverage sector are 18 separate industries, ranging in size from Slaughtering and Meat Processing (employment of 34,812 and value-added of $1,003 million in 1978) down to Wineries (employment: 1,187; value-added: $64 million).

The size distribution of plants within the food and beverage sector varies considerable from industry to industry. In

[22] Statistics Canada, Agricultural Census.
[23] Report of the Ontario Dairy Farm Accounting Project p. 1.

1978, the average number of employees per establishment ranged from a high of 290.1 in Breweries to 15.6 in the Feed Industry. Furthermore, the size distribution varies considerably within industries as well. For example, in 1978, there were 82 plants in Slaughtering and Meat Processing that employed 50-199 production workers; but at the same time, four plants each employed more than 1,000 people. Of the 4,535 plants in the food and beverage industry in 1978, 2,129 (or 46.9 percent) each employed fewer than 10 workers, while 50 establishments (1.1 percent) each had more than 500 employees.

ii) Performance - In order to assess the structure and performance of the food and beverage industry in Canada, comparisons with the manufacturing sector as a whole are useful. Relative to all manufacturing over the period 1970 to 1978 (the most recent year for which all data are available), in the food and beverage industry:

- Prices increased more rapidly (10.6 percent per year on average versus 9.6 percent per year for all manufacturing);
- Output (as measured by Real Domestic Product) increased more slowly (2.1 percent per year versus 3.5 percent);
- employment increased more slowly (0.3 percent versus one percent);
- Labour productivity (output per employee) increased more slowly (1.8 percent versus 2.5 percent);
- Average wages and salaries per employee increased more rapidly (11.3 percent versus 10.6 percent);
- Unit labour costs increased more rapidly (9.4 percent versus 7.8 percent);
- The number of establishments declined more rapidly (-3.7 percent versus minus-one percent); and
- The average number of employees per establishment increased more rapidly (4.1 percent versus two percent).

Basically, the food and beverage sector faced a number of problems during the 1970s, most of which were related to the slow-down in the growth of population and the demand for food. The low rate of productivity growth, combined with above-average increases in labour remuneration, meant that unit labour costs increased substantially. Nonetheless, there is evidence that the industry was able to adjust to the changing environment. Rationalization in the form of declining numbers of establishments took place at a greater rate than for the manufacturing sector as a whole. Furthermore, profits in the food and beverage industry did not suffer relative to those for all manufacturing. From 1970 to 1978, the return on equity (after-tax profits as a percentage of shareholders'equity) in food processing exceeded that for all manufacturing in seven out of nine years (the exceptions being 1973 and 1974). Similarly, the return on equity in the beverage industry was greater than that for all manufacturing in all years but 1974 and 1977.

The above analysis can be extended to a comparison of food processing relative to the beverage industries. From 1970 to 1978, the food processing sector experienced lower rates of growth in output, employment, productivity, and average employment per establishment. Conversely, the food processing sector experienced higher growth rates for wages and salaries per employee and unit labour costs. Finally, the number of establishments declined more slowly in food processing than in the beverage industry. Succinctly, using the above measures, the beverage sector apparently out-performed the food processing industry.

iii) Constraints - Among the factors affecting the competitive position of the processing sector are those surrounding its acquisition of raw materials. If successfully implemented, proposals in the Strategy related to production and price instability, improved operation of marketing boards, and rationalization of transportation rates would be of direct benefit in improving the international competitiveness of the food processing sector.

Other characteristics of agricultural supply also affect the competitive position of the food processing sector. For example, the relatively short season for most crops requires that plant capacity must be large relative to

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annual throughput and that inventory costs are larger than in areas such as California. Also, farm production and consumption are geographically dispersed, adding to transportation and distribution costs and limiting plant size. Government programs to encourage regional development can provide assistance in overcoming some of these constraints although the effects of such programs on the overall structure and competitiveness of the sector must be taken into account.

Government regulation in the areas of food safety, labelling, and product certification provide important benefits to processors as well as consumers. Food processors claim, however, that some regulations and the administration of others unnecessarily raise their costs or put them at a disadvantage with imported products.

This issue is being examined as part of the Economic Council's research program on government regulation.

Other constraints to improved performance by the processing sector probably differ in their impact by size of firm. To the extent that processing firms operate only one plant and the plant tends to be relatively small, for example, the firm is unlikely to be able to afford to hire the level of management expertise it might like or to obtain the services of private consultants. These smaller firms likewise have difficulty in justifying the marketing expertise that would be required to seek out and service new markets, especially export markets.

An additional difficulty faced by the smaller food processor is access to the capital required to finance needed improvements or possible plant expansion. This is especially true given current high interest rates and the effects of inflation on equipment and building costs.

Many of the larger firms in Canada, however, would be expected to have little difficulty in attracting qualified management and adequate capital. In addition, a significant number of these firms are foreign-owned and thus have access to the management and marketing expertise of their parent companies.

The degree to which food processing firms can afford to invest in research and development also is related to the size of the firm. This would be more important with respect to new product development than production processes because much of the production R & D is done by machinery supply companies. Whether these suppliers offer new technologies on a scale suitable for relatively small diversified plants is a question which might be examined.

10. Assistance to Less Developed Countries (LDC)

During the 1970s Canada's Official Development Assistance (ODA) ranged from US$346 million in 1970 to US$1036 million in 1980. In relation to Gross National Product (GNP), ODA varied from 0.42 percent in 1970 to 0.54 percent in 1975 and to 0.42 percent in 1980.

In recent years, Canada's ODA has been channelled through four primary programs: Bilateral, Multilateral, Special Programs, and the International Development Research Centre (IDRC).

Approximately half of Canada's ODA is disbursed through CIDA's Bilateral Programs. Agricultural and rural development projects, including bilateral food aid, fertilizers, and rural infrastructure, currently account for 30 to 35 percent of total Bilateral Program aid. This involves over 150 projects. Food aid consisted of approximately $188 million last year (15 percent of ODA), while many experts worked in developing countries in the renewable resource sector (agriculture, fisheries, and forestry). Fertilizers and other agricultural commodities were also provided under ODA. The balance of the Bilateral Program assistance in the agricultural sector consisted of Canadian goods and services, the provision of academic and physical training for specialists from developing countries, and a contribution to the local costs of some projects.

Multilateral Program assistance in recent years has ranged from 43 to 36 percent of ODA; in 1978-79 it was 40 percent. Multilateral aid consists primarily of grants and contributions to some 80 international institutions ranging from $10,000 to $170 million. With the exception of food, which is contributed to several multialteral agencies such as the World Food Program, the International Fund for Agricultural Development, the United Nations Relief and Welfare Agency (UNRWA), etc., multilateral aid

primarily consists of untied cash contributions. Last year food aid provided through multilateral channels consisted of $98 million or 20 percent of Multilateral Program disbursements. Many of the international agencies which Canada supports are primarily engaged in the agricultural sector.

CIDA also provides assistance to developing countries through its Special Programs (i.e. Non-Governmental Organizations (NGOs), Industrial Cooperation, etc.). Last year approximately eight percent of Canadian ODA was channelled through these programs. A significant proportion of the projects undertaken by NGOs involve rural development and agriculture. In addition, some $6.0 million in food aid was provided to developing countries through the projects funded by Canadian NGOs.

Approximately three percent of Canada's ODA is disbursed by IDRC. About 30 percent of IDRC's budget of $36 million last year was devoted to the agricultural sector, involving some 60 projects.

International experts are not optimistic about the global food situation in the next 10 to 20 years. Most experts are predicting that population increases, primarily in Third World countries, will continue to outpace growth in the production of food. As a result there are likely to be several serious crises before 2000 as global food production and reserves are inadequate to meet even the basic minimum demands of millions of people in developing countries. With the slowdown in the world economy, higher costs of energy, and unfavourable terms of trade, a number of developing countries will not have the funds to purchase essential foodstuffs even if there are no serious crop failures or natural or man-made disasters. At the same time, it is not feasible to believe that the countries which are traditionally able to export food can produce enough to meet the basic global needs or that sufficient concessional funding will be available to finance such a large-scale volume of food aid.

11. Transportation and Handling

Perhaps the most important constraint to Canada taking advantage of improved prospects in agricultural markets is capability, particularly in the grain sector, to handle product and deliver it efficiently to market. With the exception of grain, with its own special problems, the transportation system

historically has performed well. Difficulties experienced in the movement of certain products will likely continue in the short-run. These are, however, essentially problems of finding an appropriate mix of transportation capacity, modes, and rates associated with peaked movements and transitional adjustments being required to match transport capacity, changing markets, and levels of production.

a) Investment Requirements: Large private and public investment will be required in transportation and handling facilities during the 1980s, including $14 billion in the rail mode, much of it in Western Canada, where limits to capacity are beginning to be reached. Significant new investment will also likely be required in the marine mode both to increase infrastructure capacity, for example, in the Seaway ports and to replace and expand the laker fleet (perhaps 20 lakers at about $30 million each).

   In the country grain elevator system, higher levels of investment can be expected over the next five years to rationalize and modernize the system (perhaps $750 million to $1 billion compared to $250 million over the last five years). Increased capacity may also be required in the eastern transfer elevators to accommodate both increased Canadian and U.S. movements. Additional cold storage will also likely be required if winter imports of fruits and vegetables are to be replaced.

   Accommodation of real investment increases both in the transportation and storage sectors during the decade will require higher rates of return, which traditionally have been fairly low, with the implication of further pressure on rates and tariffs and of the need for continued productivity improvements. It might also suggest a real increase in government assistance, especially in the case of rail if the Crow rates remain unresolved.

b) Crow Rates: The fixed statutory rates (Crow rates) on western grain movement affect agricultural development and balanced growth. The low rates have the following consequences which will worsen over time:

   i) Net rail losses from transporting grain (after branchline subsidies), projected to accumulate to $2.5 billion

between now and 1985, will exacerbate the difficulties of funding railway investment requirements for the 1980s. As western mainline capacity limits are reached by the middle of the decade, rationing may occur. This could prevent achieving the Wheat Board grain export targets of 30 million tonnes by 1985 and 36 million tonnes by 1990. Such a transportation constraint would severely impede the achievement of grain production potential and targeted export sales and cause a significant foregone revenue loss to producers.

ii) The statutory rates result in higher prices at the farm gate for all grains on the Prairies than would be the case if compensatory rates were in force. (Farm gate prices are world prices less the costs of transportation and handling). Except during periods of excess supply, this raises production costs for the prairie livestock and secondary processing industries which use grains and oilseeds as an input. This has the effect of reducing margins and inhibiting increased production in grain- using industries in Western Canada.

12. Inadequate Long-Term Capital

a) As in the past, efficiency in agricultural production will be associated with the use of ever-larger and more expensive machinery on farm units of steadily increasing land area. Upward pressure on land prices will be maintained by the efficiencies to be gained through the application of modern technology to optimally sized farm units and also by the expected improvement in the economic returns to farming as the effective demand for food grows.

b) The foregoing factors point to the need for substantial capital to enter farming and, indeed, even to attain the available efficiencies associated with the application of modern techniques to appropriately sized land areas. There will be an increased need for working capital and short-term credit as more purchased inputs are applied to larger areas of land. It is expected that the private financial institutions will continue to meet these short-term and intermediate-term credit needs.

c) The long-term investment involved in increasing the size of farm units has been the prerequisite for the efficient

application of modern technology. It is now unlikely that such investment will take place at an optimal pace without substantial government involvement in the long-term credit market. The absence of long-term, fixed-interest-rate mortgages in the private sector makes long-term investments uncertain in light of the recent dramatic increases in interest rates. The variability of farm cash income from year-to-year is inevitable, but when this is combined with wide variations in interest rates, the risk of financial failure is greatly increased. Many of the investments with the greatest importance for economic development in farming involve large commitments relative to the equity in the existing operation, and this, too, increases the risk factor.

d) It seems clear that the productivity and output of the agricultural sector will be held back in the absence of substantial government involvement in the provision of long-term financing similar to that available to other sectors of the economy through the markets for long-term debt and equity.

FOOTNOTES

[1]F.T. Denton and B.G. Spencer, Food Demand and Nutritional Requirements in Canada: An Economic Demographic Model with Projections for the Period 1976-2001, Agriculture Canada Publication No. 79/8, June, 1979. The model contains a demand component for 27 food commodities which includes both growth and substitution effects for each commodity.

[2]This is similar to Statistics Canada Projection 1 in Population Projections for Canada and the Provinces 1976-2001, Catalogue No. 91-520, February, 1979.

[3]This forecast used a slow technical progress assumption term forecast which is consistent with recent Informetrica forecasts for 2000.

[4]Implicit in this analysis is that farm costs (excluding energy) are expected to remain constant in real terms or bear the same relationship to output prices as in the past.

[5]Proceedings of Prairie Production Symposium, Saskatoon, October, 1980.

[6]The high price is reduced from 63 to 57 percent to include the effect of the higher energy prices.

[7]These forecasts are close to those of the Canada West Foundation Task Force Report Western Canadian Agriculture to 1990 if similar assumptions for prices are used. The Task Force assumed a 28 percent increase in 10 years under constant real prices (compared with 64 percent in 25 years under similar assumptions for prices in this study).

[8]Calculated from individual grain elasticities. The price elasticities and supply response changes are summarized in Table IA for Western Canada and Table IB for Eastern Canada.

[9]The high price scenario includes the effect of higher energy costs.

[10]MacAulay, T.G. Chapters 1 and 2 of Commodity Forecasting Models for Canadian Agriculture, Agriculture Canada Technical Publication 78/3, December 1978.

[11]Petrie, T.M. Seasonal, Cyclical and Trend Variations in the Hog Industry and Cattle Industry, Agriculture Canada, 1974.

[12]These estimates are near the low end of the range of the Canada West Foundation Task Force Report.

[13]Ibid.

[14]Marzouk, M.S. "An Econometric Analysis of Supply and Marketing of Apples in Nova Scotia, CJAE, November 1972, p. 33.

[15]Stodola, B. and R. McNeil, Specification of a Potato Model, unpublished.

[16]This compares with an annual growth rate of 2.4 percent in the index of farm output for 1961 - 73.

[17]The Agrologist: Fall 1980.

[18]Remarks by E. Biggs, Ministry of the Environment, to the 16th Annual Meeting of the Ontario Institute of Agrologists, April 1975.

[19]B.W. Wilkinson, Canada's International Trade: An Analysis of Recent Trends and Patterns, 1968; A.E. Safarian, The Performance of Foreign-Owned Firms in Canada, 1969; McFetridge and Weatherley; Notes on the Economies of Large Firm Size, 1977; and Caves et. al., Competition in an Economy; A Model Applied to Canada, 1980.

[20]Census of Agriculture, Statistics Canada.

[21]G. Brinkham, H. Driver and D. Blackburn, "A Classification of Limited Resource Farmers Based on Behavioural and Economic Characteristics", University of Guelph, 1977.

[22]Statistics Canada, Agricultural Census.

[23]Report of the Ontario Dairy Farm Accounting Project p. 1.